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Solvent Waste Volumes and Characteristics, Required Treatment and Recycling Capacity, and Available Treatment and Recycling Capacity Background Document for Solvents to Support 40 CFR Part 268, Land Disposal Restrictions

Versar, Inc., Springfield, VA

Prepared for

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6850 Versar Center
Springfield, Virginia 22151

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This document discusses the volume and characteristics of hazardous solvent waste affected by Land Disposal Restrictions Evaluates the requiried treatment and recycling capacity, and identifies the unused (available) capacity of alternative treatment and recycling technologies for those solvent wastes. From the RIA (Regulatory Impact Analysis) survey data, it was estimated that a total of 2.894 billion gallons will be affected by the restrictions and require alternative treatment and recycling capacity.

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FINAL RULE

SOLVENT WASTE VOLUMES AND CHARACTERISTICS, REQUIRED TREATMENT AND RECYCLING CAPACITY, AND AVAILABLE TREATMENT AND RECYCLING CAPACITY

EPA Contract 68-01-7053

Work Assignment Nos. 13, 13, 15

Prepared for:

Office of Solid Waste
U.S. Environmental Protection Agency
401 M Street, S.W.
Washington, D.C. 20460

Prepared by:

Versar, Inc.
6850 Versar Center
Springfield, Virginia 22151

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PART A

EXECUTIVE SUMMARY

This background document discusses the volumes and characteristics of hazardous solvent wastes affected by the land disposal restrictions, evaluates the required treatment and recycling capacity, and identifies the unused (available) capacity of alternative treatment and recycling technologies for these solvent wastes.

Data from the RIA (Regulatory Impact Analysis) Mail Survey performed in 1981 were used to quantify and characterize the solvent wastes affected by the land disposal restrictions set forth in the 1984 Hazardous and Solid Waste Amendments (HSWAs). From the RIA survey data, it was estimated that a total of 2.849 billion gallons of solvent wastes are land disposed annually, and of this total, 2.54 billion gallons will be affected by the restrictions and require alternative treatment and recycling capacity.

The 1984 HSWAs also require the proper disposal of wastes generated by what are known as Small Quantity Generators (SQGs). Solvent wastes generated by the SQGs will result in an additional 8.7 million gallons. Additional demand for treatment capacity will also result from increased activities under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). EPA has estimated that CERCLA actions will generate an additional 4.1 million gallons per year of solvent waste that would be destined for land disposal if not restricted, bringing the overall quantity to 2.861 billion gallons. In addition, EPA estimates that RCRA Subtitle C corrective action procedures will result in 16.1 million gallons annually that will require alternative treatment capacity.

Respondents to the RIA Mail Survey were requested to provide a short physical description of their waste. This information is important because it allows the evaluation of the various treatment and recycling technologies with respect to the physical and chemical characteristics of the waste solvent. Using the RIA survey data, the 2.849 billion gallons of land disposed solvent waste have been divided into the following groups:

1. Solvent-water mixtures.
2. Organic liquids.
3. Organic sludges and solids.
4. Inorganic sludges and solids.

Solvent-water mixtures are characterized as predominately water with less than one percent total organic carbon or total solvent concentration. Conversely, organic liquids have total organic carbon or total solvent concentrations higher than one percent. Each waste group was further divided into halogenated and nonhalogenated organic groups using the reported hazardous waste codes (i.e., F001 through F005 or combinations thereof).

The majority of the organic sludges are reported to be residues from solvent reclamation and recycling practices. As such, these waste streams frequently contains total organic concentrations higher than one percent. Inorganic sludges or solids are characterized as treatment sludges and filter cakes, which have high solids content. Inorganic solids are also assumed to include soils contaminated with solvent constituents.

Given the physical and chemical characteristics of these groups, four basic management practices were identified as the best demonstrated available technologies (BDAT) for solvent wastes: treatment in tanks (biological treatment, carbon adsorption, or steam stripping), incineration, fuel substitution, and distillation for solvent recovery.

The physical and chemical characteristics of the waste groups were compared with the restrictive waste characteristics for each of the above treatment and recycling technologies. Based on this comparison, each of the technologies is applicable to different waste groups, as shown below:

Waste stream	Appropriate treatment and recycling technologies
1. Solvent-water mixtures	Wastewater treatment in tanks
2. Organic liquids	Distillation Fuel substitution Incineration
3. Organic sludges	Incineration
4. Inorganic sludges or solids	Incineration

The total volume of solvent wastes (in million gallons per year) to be affected by the land disposal restrictions,* distributed by required alternative treatment and recycling capacity, is shown below:

Treatment or recovery technology	Waste quantity requiring alternative capacity
Distillation	3.4
Fuel substitution	15.3
Incineration (liquids)	19.0
Incineration (solids)	21.7
Treatment in tanks (wastewater)	2,480.7

The capacity required for small quantity generator wastes cannot be determined precisely; therefore, the Agency has distributed the capacity demand for these wastes between incineration, distillation and fuel substitution based on the estimates of relative demand projected for those technologies. EPA has assigned the entire capacity demand for CERCLA response actions and RCRA corrective action wastes to incineration because this technology is currently projected to be the alternative technology used during the next year for the majority of these wastes.

Adding in the capacity demands for the SQG, CERCLA, and RCRA corrective action wastes and combining the capacity requirements for incineration allow comparison to the estimates of available capacity (all in million gallons per year):

---

* Only for the volume estimates based on RIA Mail Survey data. Additional waste volumes include those of SQG, CERCLA, and RCRA corrective action wastes.

Treatment or recovery technology	Waste quantity requiring alternative capacity	Unused (available) capacity
Distillation	4.2	225.0
Fuel substitution	18.8	> 24.0
Incineration	65.3	22.6
Wastewater treatment	2,481.0	2,103.0

Analysis of capacity and demand shows shortfalls in available wastewater treatment and incineration capacity for solvent wastes. As a result of this analysis, EPA has clearly identified the basis for extension of the effective date for at least some wastes requiring incineration and wastewater treatment.

PART B

VOLUME OF SOLVENT WASTES (F001-F005) AFFECTED BY THE LAND DISPOSAL RESTRICTIONS

This part of the background document presents an overview of solvent waste generation rates and management practices. The data and information presented here are used in Part C to assess alternative treatment and recycling capacity needs for solvent wastes restricted from land disposal by today's rulemaking.

1. SUMMARY OF DATA GATHERING METHODOLOGY

Data concerning the volume of solvent wastes generated each year and the manner in which these wastes are currently being managed were obtained from an industry survey. The survey and resulting data base are officially known as the National Survey of Hazardous Waste Generators and Treatment, Storage, and Disposal Facilities Regulated under RCRA in 1981 (Ref. 2). It is more commonly referred to as the 1981 OSW RIA (Regulatory Impact Analysis) Mail Survey, the term that is used throughout the remainder of this document.

During the survey, questionnaires were mailed to a statistically selected population of facilities regulated under RCRA in 1981. Questionnaire recipients were generators of hazardous waste and/or facilities that treated, stored, or disposed of hazardous waste. This latter category of facilities, called TSD facilities, are those facilities that conduct either commercial or private treatment, storage, or disposal operations. The questionnaire received by the TSD facilities requested specific data and information on the volumes and types of wastes managed. Wastes were identified by the TSD facilities using the conventional EPA hazardous waste codes established in 40 CFR Part 261.

Approximately 11,000 questionnaires were mailed, with a 94 percent response rate. All responses were screened prior to inclusion in the data base to ensure that reported wastes were hazardous under the RCRA definition, and that they were treated, stored, or disposed of in processes regulated under RCRA.

Valuable data concerning types of wastes generated as well as land disposal practices were obtained from this survey. The resulting RIA Mail Survey data base has undergone extensive evaluation (Refs. 1, 2). This data base provides the basis for the information and data presented in this section concerning waste volumes and current land disposal practices.

Many commenters to the proposed rule of January 14, 1986, objected to EPA's utilization of the 1981 RIA Mail Survey for estimation of the volumes of hazardous wastes land disposed to be affected by the restrictions, based on their belief that these data are highly inaccurate and out of date. This comment was not directed at the estimates of the solvent wastes in particular, but at the use of the RIA Mail Survey, in general, to estimate the volumes of land disposed hazardous wastes.

One commenter qualified this claim, contending that EPA's data grossly underestimated the quantities of hazardous waste that were annually land disposed of (all hazardous wastes, not just solvent wastes). This statement was based on data from 725 facilities with standard industrial classification code (SIC) of 2800 (i.e., Chemicals and Allied Products). The data indicated that this industry treated and disposed of approximately 202 million tons of hazardous waste per year, including solvent wastes. Since EPA estimated only 240 million tons per year for all hazardous waste facilities, the commenter felt that EPA had underestimated the total quantity of hazardous waste. The same commenter stated that EPA estimated that this industry managed 66 percent of the total 240 million tons. These figures, when multiplied together, yield a total quantity of 158 million tons for this particular industry (SIC 2800). EPA does not believe that 158 million tons is a gross underestimation of 202 million tons; the Agency does believe that the 22 percent difference in the total quantities is analytically acceptable.

The commenter did not indicate whether the quantity figures were for RCRA hazardous wastes or for all wastes considered hazardous by State and/or local authorities. EPA's estimates of waste quantities specifically exclude hazardous wastewaters, which are exempt from RCRA (such as those treated solely in tanks and subsequently discharged under NPDES). It was not made clear that the commentor's estimate of 202 million tons of wastes treated and disposed of includes or excludes these wastewaters.

In a 1986 report on the Chemical and Allied Products industry (SIC 2800), the Chemical Manufacturers Association reported that the total amount of hazardous waste treated and disposed of by responding plants was 278.5 million tons (276.8 million tons of wastewater and 1.7 million tons of solid waste). Of the solid wastes treated and disposed of, 0.57 million tons were landfilled, 0.52 million tons were incinerated, 0.46 million tons were disposed of in surface impoundments, and 0.18 million tons were treated by other methods. The corresponding 1981 EPA estimates for all RCRA hazardous waste were 3.0 million tons of hazardous waste landfilled, 1.7 million tons incinerated, 19 million tons disposed of in surface impoundments, and 17 million tons treated by other means. EPA believes that these figures, which represent significantly larger quantities, further substantiate that these estimates of quantities of wastes being land disposed are not grossly underestimated.

No commenters specifically provided alternative estimations of the total quantities of F001, F002, F003, F004, and F005 solvent wastes that were land disposed. The commenters did not offer any mechanism for extrapolation of their total quantity of wastes (202 million tons) to the quantity of solvent wastes. Therefore, the Agency believes that the estimates based on the data provided by the 1981 OSW RIA Mail Survey provide the best and only estimate of quantities of solvent wastes land disposed annually.

Several commenters also suggested the use of alternative data sources such as Part A applications, Part B applications, RCRA Biennial Reports, and/or various State and regional reports. In response to such comments, the Agency agrees with the commenters that the data contained in these sources are more recent, yet maintains that the RIA Mail Survey is the only source that allows EPA to estimate nationwide quantities of land disposed waste volumes by combination of waste code, physical-chemical form, and management practice, for determination of required alternative treatment and recycling capacity.

2. LAND DISPOSAL PRACTICES

Land disposal is defined under RCRA as any placement of hazardous waste into or on the land. Therefore, storage and treatment of hazardous waste in or on the land is also considered land disposal. Land disposal methods can be divided into numerous categories. Four of these methods are addressed in detail in this document: storage and disposal in landfills; storage in waste piles; treatment and disposal by land application; and treatment, storage, and disposal in surface impoundments. Utilization of salt dome formations, salt bed formations, and underground mines and caves are additional methods of land disposal that are affected by this rulemaking. Currently there is insufficient information to document the volumes of solvent wastes disposed of by these last three methods; therefore, they are not addressed in the analysis of volumes and alternative treatment capacity. Underground (deepwell) injection, another form of land disposal, will be covered under a separate rulemaking; thus, it is not considered further in this analysis.

The quantities of solvent wastes managed by each of the land disposal methods affected by this final rulemaking were estimated using RIA Mail Survey data. The survey requested treatment, storage, and disposal facilities to provide information on the type and quantity of each hazardous waste managed at that facility, as well as the method of management. The solvent waste codes include the waste codes F001, F002, F003, F004, and F005. The data obtained on wastes reflecting these waste codes were tabulated and assigned statistical weights. They were then used to project national estimates of waste volumes (Ref. 2).

Table B-1 presents the volumes of solvent wastes currently land disposed by each of the four methods: landfill, land application, waste pile, and surface impoundment. Surface impoundments are further divided into four management techniques. These present a special case, which is discussed separately below. The estimates in Table B-1 differ slightly from those developed previously for EPA (Ref. 1) for the following reasons:

1. Disposal through underground (deepwell) injection is no longer included;
2. Treatment, storage, and disposal using surface impoundments are now included; and
3. Storage in waste piles is now included.

EPA has also reanalyzed the 1981 RIA Mail Survey data for today's rule, to account for the changes from the proposed rule listed below (described in detail in Part B.4):

1. U and P code solvent wastes are no longer included unless mixed with F001 through F005 wastes;
2. Mixtures of F001 through F005 with other nonsolvent hazardous wastes are now included;
3. Physical-chemical form descriptions of several waste streams in the RIA data base have been changed; and
4. The total volume of wastes treated, or treated and stored, in surface impoundments to be affected by the restrictions has been changed.

Table B-1 Volume of Solvent Wastes Currently Land Disposed
(million gallons per year)

Waste management practice	Volume	Percent of total
Large quantity generators*:		
- Landfill	44.74	1.57
- Land application	0'	0
- Waste pile storage	0.743	0.03
- Disposal in surface impoundments	8.779	0.31
- Treatment only in surface impoundments	388.7	13.6
- Storage only in surface impoundments	309.2	10.9
- Treatment and storage in surface impoundments	2,096.7	73.6
Total land disposal (RIA Survey data) (excluding deepwell injection)	2,848.9	100

* Source: RIA Mail Survey (Ref. 2)

Table B-1 presents estimates of the volume of solvent wastes currently treated, stored, and disposed of in surface impoundments. Four scenarios were considered during evaluation of the quantity of solvent wastes that are managed in surface impoundments:

1. Storage in surface impoundments,
2. Treatment in surface impoundments,
3. Concurrent storage and treatment in surface impoundments, and
4. Disposal in surface impoundments.

Data from the RIA Mail Survey were used to estimate the volume of solvent wastes currently being managed by each of these methods, as well as the volume of those solvent wastes that will require alternative treatment or recycling capacity. The use of questionnaire data concerning each of these methods is discussed below.

About 8.78 million gallons of solvent wastes are disposed of in surface impoundments each year. Disposal in surface impoundments is considered land disposal, which is restricted by this rulemaking. Consequently, all of this waste will require treatment, recycling, or disposal by alternative methods as a result of this final rulemaking.

A number of respondents reported that they were storing solvent wastes in surface impoundments. Storage implies a temporary placement of wastes in the surface impoundment, while disposal implies a permanent containment. EPA has estimated that all of the solvent wastes stored in surface impoundments are eventually treated or recycled, or they are routed to permanent disposal in other existing units. Thus, the volumes of solvent wastes reported as being stored in surface impoundments were not included in the estimates of volumes requiring alternative treatment capacity. This was done to avoid counting them twice, i.e., once when they are stored and again when they are finally disposed of. These wastes stored in surface impoundments will require alternative storage capacity. These estimations are consistent with the economic impact assessment prepared in support of this rule and are based on the economic feasibility of meeting the requirements set forth in section 3005 (j)(11)(A) and (B). Three hundred nine million gallons of solvent wastes are stored in surface impoundments per year.

In addition to the solvent wastes stored in surface impoundments, 2.49 billion gallons of solvent wastes per year are estimated to be treated, or treated and stored concurrently, in surface impoundments. Under RCRA, surface impoundments may continue to receive hazardous wastes if the surface impoundments are used for treatment. These surface impoundments, however, must be in compliance with certain design and operating criteria (see RCRA Section 3005(j)(11)(A) and (B)). According to RCRA, any surface impoundment that continues to receive banned solvent waste must be equipped with double liners, leachate collection systems, and groundwater monitoring systems. EPA has estimated that all of the solvent wastes currently treated in surface impoundments will require management by alternative treatment technologies on an interim basis to allow retrofitting to meet requirements. Those wastes that are both treated and stored in surface impoundments will also require alternative storage capacity. These estimates are consistent with the findings of the economic impact assessment supporting this rulemaking (Ref. 3).

The wastes being treated in these impoundments ultimately will not require alternative treatment capacity provided that the facilities meet all of these requirements. The 1981 OSW RIA Mail Survey Data Base, used for calculating the quantities of solvent wastes, contains little information that can be used to extrapolate the quantities of wastes, according to treatability groups, being treated in impoundments that currently meet these requirements. Therefore, the Agency has assumed that all of these wastes currently being treated in impoundments will require alternative treatment capacity on an interim basis, while the facilities comply with the appropriate impoundment standards.

These standards include a requirement that all hazardous residuals must be dredged from these treatment impoundments on a periodic basis. While the overall quantity of this dredged material can be estimated, the amount of waste that would be considered hazardous is difficult to determine. The effect on the total quantity of all solvent wastes is extremely complex and is also difficult to estimate. As facilities begin to comply with all of these standards, the total quantity of wastes that originally was assumed to require interim alternative treatment capacity will decrease and the quantity of dredged material requiring alternative treatment capacity will increase. The chemical composition of this dredged material will determine the appropriate treatment technology. The final total solvent composition in this material is difficult to accurately estimate. The individual solvent concentrations are affected by different rates and efficiencies of the specific treatment processes being utilized in the impoundment. The final concentrations are also based on the equilibrium established by the variation in volatilization rates of the individual solvents as influenced by factors such as influent and effluent flow rates, diffusivity coefficients, solubilities, precipitation and coprecipitation rates, ambient air temperature and pressure, and variations in wind speed. Based on this information, EPA has determined that for today's rule, an estimate of the quantity of dredged materials will not be included in the estimate of the total quantity of solvent wastes requiring alternative treatment capacity; instead, the entire quantity of solvent wastes that had been estimated to require interim capacity will be used.

Based on the analysis provided above, Table B-2 presents the total volume of solvent waste that will require alternative treatment and recycling capacity.

3. IDENTIFICATION OF PHYSICAL AND CHEMICAL CHARACTERISTICS OF SOLVENT WASTES

In order to assess the treatment capacity needs that will result from the land disposal restrictions, it is necessary to identify the physical

Table B-2 Volume of Solvent Wastes Affected by the Land Disposal Restrictions (million gallons per year)

Waste management practice	Volume
Landfill	44.74
Land application	0
Waste pile storage	0.743
Disposal in surface impoundments	8.779
Treatment only in surface impoundments	388.7
Storage only in surface impoundments	0
Treatment and storage in surface impoundments	2,096.7
Total	2,539.7

and chemical form of the 2.54 billion gallons of solvent wastes land disposed annually that will be affected by the restrictions and require alternative treatment and recycling capacity. Without this information, it is not possible to identify which treatment technologies are applicable to a given waste stream. For example, solids contaminated with solvents are not amenable to reclamation by distillation; the high solids level would plug or foul the system.

Data contained in the RIA Mail Survey were used to identify these waste characteristics. The questionnaires included a space for respondents to provide a written description of each waste, in addition to its RCRA waste code. This information has been included in the data base, and it forms the basis for identifying the quantities of solvent wastes generated and managed by physical-chemical form. The descriptions of the wastes were analyzed and condensed into the physical-chemical form codes shown in Table B-3. All wastes were further identified as inorganic solids, inorganic sludges, inorganic liquids (in this case, solvent-water mixtures), organic liquids, organic sludges and solids, or miscellaneous.

The hazardous waste codes reported by the respondents can be used to identify the quantity of waste that is halogenated (i.e., containing bromine, chlorine, fluorine, or iodine). The Agency has assumed that the halogen content and the physical form of the waste will dictate which alternative treatment technology will be used and has thus estimated the necessary alternative treatment capacities based on the descriptions of

Table B-3 Codes for Physical Descriptions of Waste Streams

Inorganic solids	101. Contaminated Dirt
	102. Fly Ash
	103. Baghouse or APCD Dust
	104. Bottom Ash or Slag
	105. Spent Carbon
	106. Spent Adsorbents (NOS)
	107. Spent Filter Aids
	108. Polymerized Solids
	109. Spent Catalysts
	110. Off-Specification Solid Chemicals
	111. Waste NaOH or KOH
	112. Metal Fines
	113. Asbestos
Inorganic sludges	200. Inorganic Sludge (NOS)
	201. Metal Hydroxide Sludge
	202. Wastewater Treatment Sludge
	203. Biotreatment Sludge
	204. Cooling Tower Sludge
	205. Lagoon/Pond Sludge
	206. Filter Cakes
	207. APCD Sludge
	208. Sludge from Electroplating
Solvent-water mixtures	300. Aqueous Solution (NOS)
	301. Wastewater (NOS)
	302. Process Water
	303. Wash/Rinse Water
	304. Cooling Tower Blowdown
	305. Lagoon/Pond Water
	306. Incinerator Scrubber waters
	307. Caustic Scrubber/Petroleum Refinery
	308. Waste Acid
	309. Waste Caustic Solutions
	310. Concentrated Chemical Solutions
	311. Waste Acidic Solution
	312. Acid and Base
	313. Chromic Acid Waste

NOS = Not Otherwise Specified

Table B-3 (continued)

Organic fluids	400.	Organic Liquid (NOS)
	401.	Spent Solvents
	402.	Light Ends
	403.	Hydraulic Oils
	404.	Cutting Oils
	405.	Transfer Oils
	406.	Waste Oils (NOS)
	407.	Oil/Water Emulsion
	408.	Waste Paint
	409.	Paint Thinner
	410.	Off-Specification Liquids/Solvents
	411.	Coatings (laquer, varnish, epoxy)
Organic sludges/solids	500.	Organic Sludge (NOS)
	501.	Heavy Ends
	502.	Still Bottoms/Residues
	503.	Tars
	504.	Oily Sludge
	505.	Paint Sludge
	506.	Tank Bottoms
	510.	Solid Organic Chemicals
Miscellaneous (unknown/undescribed)	000.	Unknown/Undescribed
	601.	Lab Packs
	602.	Lab Wastes
	603.	Liquids (NOS)
	604.	Resins (form unspecified)
	605.	Paint Stripper
	606.	Sludge (NOS)
	610.	Empty Containers
	611.	Gas
	612.	Organic Waste (NOS)

NOS = Not Otherwise Specified

the wastes provided for those wastes land disposed in 1981. This information is important because halogen content influences the treatability of the waste and could preclude the use of a given treatment technology.

Solvent wastes reported as containing F001 and F002 are halogenated wastes because the constituents for which they are listed are halogenated (see 40 CFR, Part 461, Appendix VII). Similarly, solvent wastes reported as containing F003, F004, and F005 (and not containing F001 or F002) are considered nonhalogenated wastes. Given this information, the total volume of solvent waste affected by the land disposal restrictions as presented in Table B-2 can be divided into waste groups. This distribution is shown in Table B-4.

Table B-5 presents the distribution of the total estimated volumes of RIA solvent wastes that require alternative treatment and recycling capacity by waste group. Of the 2.54 billion gallons of RIA solvent wastes requiring alternative treatment or recycling capacity, 27.2 million gallons were described as spent solvents or organic liquids, 10.1 million gallons were described as still bottoms or organic sludges, 2.48 billion gallons were described in a manner which indicated that they may be solvent-water mixtures (wastewaters) generated by the mixture rule (mixed with primarily aqueous wastes), and approximately 21.7 million gallons were described in a manner which indicated that they may be inorganic sludges and solids generated by the mixture rule (mixed with primarily inorganic, sludge-like materials).

1929s

Table B-4 Reported Physical Form and Halogen Content of RIA Solvent Wastes Affected by the Land Disposal Restrictions (million gallons per year)

Waste description	Volume
Organic liquids:	
Halogenated	12.28
Nonhalogenated	14.91
Total	27.19
Organic sludges:	
Halogenated	6.365
Nonhalogenated	3.717
Total	10.08
Inorganic sludges/solids:	
Halogenated	21.36
Nonhalogenated	0.378
Total	21.74
Solvent-water mixtures	
Halogenated	1,831.9
Nonhalogenated	648.8
Total	2,480.7
Total:	
Halogenated	1,871.9
Nonhalogenated	667.8
Grand total	2,539.7

Table B-5. Distribution of Total Land Disposed Solvent Waste Volumes by Physical Form, Halogen Content, and Disposal Method*
(million gallons per year)

Waste description	Landfill	Waste pile storage	Treatment in surface impoundments	Treatment and storage in surface impoundments	Disposal in surface impoundments	Total
Organic liquids						
Halogenated	11.276	0.009	0	0.172	0.822	12.28
Nonhalogenated	12.813	0.004	0.257	0.023	1.813	14.91
Total	24.089	0.013	0.257	0.195	2.635	27.19
Organic sludges						
Halogenated	2.383	0	0	3.982	0	6.365
Nonhalogenated	2.673	0.730	0.071	0.243	0	3.717
Total	5.056	0.730	0.071	4.225	0	10.08
Inorganic sludges/solids						
Halogenated	15.213	0	0	0	6.144	21.36
Nonhalogenated	0.378	0	0	0	0	0.378
Total	15.591	0	0	0	6.144	21.74
Solvent-water mixtures						
Halogenated	0	0	187.495	1,644.4	0	1,831.9
Nonhalogenated	0	0	200.876	447.95	0	648.8
Total	0	0	388.790	2,092.4	0	2,480.7
TOTAL						
Halogenated	28.872	0.009	187.495	1,648.506	6.966	1,871.9
Nonhalogenated	15.864	0.734	201.204	448.211	1.813	667.8
Grand Total	44.736	0.743	388.699	2,096.717	8.779	2,539.7

* Land application 0

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Table B-6 presents a further breakdown of reported physical chemical form of the RIA solvent wastes to allow for a more accurate assessment of capacity requirements.

Because concentration data are not provided by the Survey, EPA is taking a conservative approach by assuming that all of these solvent wastes exceed the levels set by the treatment standards finalized in today's rule and that these wastes will be restricted from land disposal.

a. Solvent-Water Mixtures (Derived Wastes)

In the preamble to the proposed rule, those wastes considered as solvent-water mixtures were solvent wastes that were specifically described as aqueous solvent wastes or wastewaters. The Agency has assumed that these are indeed F001 through F005 wastes derived from the mixture rule, which states that if any hazardous wastes are mixed with other wastes, the entire waste now becomes a hazardous waste with the appropriate waste code (and is regulated as such).

The Agency estimates that these wastes contain less than one percent total organic carbon and approximately 99 percent water. This is consistent with EPA's guidance in defining wastewater as a waste with primarily water and only a few percent of contaminants. In addition, several of the large volume, aqueous solvent wastes identified in the TSDF mail survey were specifically described as containing 99 percent water.

Several commenters suggested that EPA, by defining solvent-water mixtures as those wastes containing less than one percent total organics, would exclude many nonhazardous wastewaters which they indicate can

Table B-6. Further Detailed Breakdown of Reported Physical Form and Halogen Content of RIA Solvent Wastes Affected by the Land Disposal Restrictions
(million gallons per year)

Waste description	D-field code	Halogenated	Nonhalogenated	Total
Organic liquids:				
Not otherwise specified	400	5.714	10.466	16.180
Spent solvents	401	5.743	4.440	10.183
Waste paint	408	0.822	0.004	0.826
Total		12.28	14.91	27.19
Organic sludges:				
Not otherwise specified	500	2.870	2.017	4.887
Still bottoms/residues	502	3.495	1.650	5.145
Paint sludge	505	0	0.050	0.050
Total		6.365	3.717	10.08
Inorganic sludges/solids:				
Not otherwise specified	100	0	0.275	0.275
Metal hydroxide sludge	201	5.054	0	5.054
Wastewater treatment sludge	202	15.362	0	15.362
Biotreatment sludge	203	0.941	0	0.941
Filter cakes	206	0	0.103	0.103
Total		21.36	0.378	21.74
Solvent-water mixtures:				
Wastewater	301	187.495	646.213	833.71
Scrubber waters	306	1,644.352	2.608	1,646.96
Total		1,831.85	648.82	2,480.7
Grand Total:		1,871.9	667.8	2,539.7

typically contain higher than one percent total organics. One commenter suggested that the level be raised to four percent total organics. However, none of these commenters submitted any data substantiating these comments.

One of the commenters stated that EPA had overestimated the concentrations of solvents in wastes identified as wastewaters. The commenter stated that the concentrations of total solvents should be represented by a median value of 0.055 percent rather than the mean value of 0.3 percent. The commenter supplied data on wastes containing parts-per-million levels of individual solvent constituents. EPA believes that the commenter misinterpreted EPA's intended use of this data. EPA recognizes that there are many wastewaters that contain only parts-per-million or even parts-per-billion levels of individual solvent constituents. EPA used a summation of the individual concentrations, to arrive at the estimations of total solvent concentrations in wastewaters classified as F001-F005. EPA has established a definition of solvent-water mixtures based on total solvent concentrations of less than one percent for the majority of wastewaters. EPA does not believe that either the mean or the median should be used to establish the upper concentration limit for the definition of a solvent-water mixture, but rather, does believe that the total solvent concentration should be used as the upper level concentration limit, the maximum solvent concentration that is representative of this type of waste

In the proposed rule, the Agency indicated that it had extrapolated solvent concentrations for these F001 through F005 aqueous solvent wastes from data indicating that the majority of wastewaters from the organic chemicals manufacturing industry being treated in surface impoundments contained less than one percent total solvents. In the proposed rule, the Agency had selected the analysis of total organic carbon (TOC) as a surrogate analysis for the total solvent concentration. While the Agency recognizes that there is no standard method for estimating total solvent concentration in wastewater, standard methods do exist for the individual solvent constituents, which can be summed to yield a total solvent concentration for a particular waste.

The Agency never intended to include nonhazardous wastes or wastewaters in this rule, and the Agency agrees with the commenters that nonhazardous wastes and wastewaters with higher than one percent total organic carbon may exist. The Agency has thus reevaluated its position on the method for determining that an F001, F002, F003, F004, and/or F005 waste is considered a solvent-water mixture (wastewater). For the purposes of today's rule, the Agency is defining a solvent-water mixture as any F001, F002, F003, F004, and/or F005 waste that is primarily water and contains either (1) less than one percent total organic carbon, or (2) less than one percent total solvents.*

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*Defined as the arithmetic sum of the individual solvent concentrations for those constituents for which all of these waste codes are listed, as determined by GC or GC/MS methods (gas chromatography or gas chromatography/mass spectrometry) in accordance with the appropriate standard methods for those constituents and waste types.

The Agency believes that the total organic carbon analysis provides an inexpensive screening technique for identifying some F001 through F005 as aqueous solvent wastes. Those facilities that have wastes which exceed a total organic carbon content of one percent can elect to utilize the alternative definition of less than one percent total solvent concentration. This choice of methods is intended for use as a screening procedure only to identify those F001, F002, F003, F004, and/or F005 solvent wastes to be designated as solvent-water mixtures. For the purposes of today's rule, the Agency does not intend this definition to be used to classify a wastewater as a hazardous solvent waste; however, this does not preclude the Agency from modifying or clarifying this definition in the future.

b. Organic Liquids

According to the Agency's estimations, only 37 percent of the 27.2 million gallons of organic liquids that are land disposed annually are actually described as "spent solvents." By definition, all wastes listed in 40 CFR, Part 261.31, as F001, F002, F003, F004, and F005 are spent solvents. However, it is EPA's judgment that only those solvent wastes identified as spent solvents in the survey are actually spent solvent wastes as implied by definition (50 FR 30908, July 30, 1985), i.e., used, highly concentrated solvent wastes resulting from certain industrial applications "that no longer meet the specifications for which the solvent was originally used because they have become contaminated with physical or chemical impurities and are no longer fit for use without being regenerated, reclaimed, or otherwise reprocessed."

For example, metal degreasing is a common means of generating a concentrated spent solvent. Industrial grade metal degreasing solvents such as 1,1,1-trichloroethylene contain less than 100 mg/l water and less than 10 mg/l nonvolatile residue. As metal degreasing operations proceed, solvent vapors are contained within the system by contacting the vapors with cooling coils so that the vapors are condensed and returned to the system. At the same time, atmospheric moisture also condenses on the cooling coils. Quite frequently, water that may accumulate in the solvent during degreasing is removed by gravity separation in a quiescent tank. If the waste concentration is allowed to increase in the solvent during degreasing, the chlorinated hydrocarbons begin to hydrolyze and form hydrochloric acid. As this occurs, the effectiveness of the solvent is reduced and a corrosive mixture is produced. Hydrolysis is prevented through incorporation of chemical additives into the solvent that react with the water (Ref. 13).

Consequently, spent solvents from modern degreasing operations contain a high percentage of solvent contaminated with oil and grease removed from the metal parts. The water accumulation in the spent solvent from modern units is negligible.

In older units that do not remove water, water will accumulate in the system and can reach concentrations as high as 80 percent (Ref. 1). Even so, the solvent content is still reported to be above 10 percent, in addition to a 5 percent oil content.

Almost 90 percent of the 27.2 million gallons of organic liquids that are land disposed annually are estimated to be landfilled. The Agency recognizes that the descriptions of the land disposed wastes from 1981 do not reflect the recent restrictions on liquids being disposed of in landfills. However, the Agency believes that those solvent wastes are fluid organic wastes which are still being generated as such, but are currently being "solidified" with sorbents or other inert materials to change the physical state of the wastes prior to landfilling. The Agency believes that the quantities associated with these wastes represent those pumpable organic solvent wastes currently being generated and landfilled that would be directed to alternative treatment capacity as a result of today's final rule. The Agency has assumed that the halogen content and the physical form of the waste prior to this "solidification" process will dictate which alternative treatment technology will be utilized, and has thus estimated the necessary alternative treatment capacities based on the descriptions of the wastes land disposed in 1981.

c. Organic Sludges and Solids

The majority of the described wastes in this group are reported to be heavy ends, still bottoms, or residues from distillation units used to reclaim spent solvents, all of which are high in solids content. Spent solvent wastes, by definition (40 CFR, Part 261.31), also include still bottoms from recovery of spent solvents and spent solvent mixtures. Waste characterization from the (ISDB; Ref. 4) show that these wastes contain significant quantities of solvents. As shown in Table B-7, solvent concentration is generally reported to be above one percent. For many of the solvent constituents, the mean concentration is above 10 percent and ranges up to 50 percent.

Table B-7. Mean Solvent Concentrations of Distillation Residues

(Percent)

Constituent	Heavy Ends Number of reported values	Heavy Ends Mean concentration	Distillation Residues Number of reported values	Distillation Residues Mean concentration
Carbon disulfide	4	53	-	-
Methyl isobutyl ketone	2	30	1	30
Toluene	32	27	23	30
Acetone	9	25	6	23
n-butyl alcohol	12	23	8	22
Isobutanol	5	22	4	20
Ethyl acetate	4	18	3	22
Xylene	7	13	5	10
Ethylbenzene(s)	14	11	6	15
Chlorobenzene	17	11	14	10
Methanol	14	11	8	3
Tetrachloroethylene	26	8	12	4
Methylene chloride	14	6	9	0.2
Carbon tetrachloride	19	6	8	5
Trichloroethylene	22	4	14	4
1,2-Dichlorobenzene	8	2	6	3
Cyclohexanone	6	1	4	3
1,1,1-Trichloroethane	12	0.3	-	-
Trichlorofluoromethane	2	-	2	-

Source: Science Applications International Corporation. Industry Studies Data Base. Prepared for the U.S. EPA, Office of Solid Waste. 1985 (Ref. 4).

d. Inorganic Sludges and Solids (Derived Wastes)

Descriptions of these wastes that were reported in the RIA Mail Survey included metal hydroxide sludge, wastewater treatment sludge, biotreatment sludge, and filter cake. As listed, F001 through F005 are spent solvents and/or still bottoms. However, by the mixture rule, if any of these solvent wastes are combined with other wastes, the entire waste becomes a solvent waste with the resultant appropriate solvent waste code. The Agency feels that these additional waste descriptions are an indication of the degree to which this occurs. Subsequently these derived solvent wastes must also be treated. The Agency cannot determine whether there was intent to create these derived solvent wastes, but does feel that there exists a high probability that the rate of generation of these wastes can be significantly reduced through the institution of various waste minimization procedures.

The Agency believes that the one percent total solvent concentration and one percent total organics content can be extended to also define solvent wastes that are primarily inorganic sludges or solids. The Agency recognizes that there is no standard method for determining total organic carbon in inorganic solids. The primary test for inorganic sludges and solids is, therefore, the procedure outlined previously (under solvent-water mixtures) for total solvent concentration. This does not preclude a facility from petitioning the Agency by submitting analyses that can sufficiently demonstrate that a particular inorganic waste contains less than one percent total organic carbon.

For the purposes of today's rule, the Agency is therefore, defining an inorganic sludge or solid waste as any F001, F002, F003, F004, and/or F005 solvent waste which is primarily inorganic with no greater than one percent total solvents.*

All other F001, F002, F003, F004, and/or F005 solvent wastes, by nature of these definitions, are solvent-water mixtures or exceed either (1) one percent total solvent concentrations or (2) one percent total organic carbon and are, therefore, not considered inorganic sludges or solids.

4. CHANGES FROM THE PROPOSED RULE: REANALYSIS OF SOLVENT WASTE VOLUMES AFFECTED BY THE LAND DISPOSAL RESTRICTIONS

Several changes have been made to the proposed rule and to the RIA Mail Survey data base that affect the wastes being regulated, their volumes, and the distribution of the wastes into waste groups requiring alternative capacity. The estimate of the total quantity of solvent wastes land disposed in the proposed rule included all wastes designated as F001, F002, F003, F004, F005, the corresponding off-specification products ("U" or "P" wastes), any wastes indicated to be mixtures of these waste codes only, and solvent wastes from small quantity generators.

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*Defined as the arithmetic sum of the individual solvent concentrations for those constituents for which all of these waste codes are listed, as determined by GC or GC/MS methods in accordance with the appropriate standard methods for those constituents and waste types.

First, in the January 14, 1986, proposed rule for solvents, EPA estimated the quantities of solvent wastes land disposed, including waste codes designated as off-specification products, i.e., waste codes beginning with a U or P. For today's rule, EPA has decided not to promulgate the proposed rules for those wastes designated as off-specification products. The reanalysis to estimate the total quantity of solvent wastes covered under today's rule indicated that the quantity of U and P code solvent waste land disposed is about 11.2 million gallons per year. This accounts for only a 0.4 percent decrease in the volume of solvent waste affected by today's rule.

The second change was the decision by the Agency to include the wastes that were mixtures of F001, F002, F003, F004, and/or F005 with other (nonsolvent) RCRA hazardous wastes, rather than just mixtures of only F001, F002, F003, F004, and/or F005 included in the proposed rule. The effect of this decision was to include the volumes of five additional mixed wastes (refer to Table 1-1 in Appendix A for further detail). These are as follows:

1. A nonhalogenated inorganic solid waste with a weighted volume of 275,466 gallons, reported as being landfilled (waste code = X042; refer to Tables 3-1 and 3-2 in Attachment 3 of Appendix A for a complete listing of the mixed waste codes);
2. A halogenated wastewater treatment sludge with a weighted volume of 15,212,765 gallons, reported as being landfilled (X067);

3. A nonhalogenated organic sludge with a weighted volume of 2,010,975 gallons, reported as being landfilled (X021);

4. A halogenated organic sludge with a weighted volume of 823,531 gallons, reported as being treated and stored in a surface impoundment (X022); and

5. A halogenated wastewater with a weighted volume of 1,644,351,582 gallons, reported as being treated and stored in a surface impoundment (X173).

The total volume associated with these land disposed wastes is 1.663 billion gallons, or almost 65 percent of the land disposed volume affected by today's ruling. Wastes identified as solvent-water mixtures account for 1.644 billion gallons of this increase. This is consistent with several comments contending that EPA had underestimated the quantity of solvent-water mixtures.

EPA performed follow-up inquiries to several facilities who had responded to this survey in order to confirm the descriptions of physical/chemical forms (Ref. 15). Some of the facilities indicated that they no longer handled these wastes. However, EPA does not believe that these responses can be accurately extrapolated to the entire survey population to reflect all of the closures or partial closures that have taken place since 1981. EPA also believes that such extrapolation would disrupt the statistical reliability of the 1981 survey.

EPA does believe that these responses support changes to the descriptions of the wastes in the data base. The responses from two facilities indicated that a 172.6 million gallon waste and a 28.3 million gallon waste that had been previously identified in the survey as organic liquids were actually solvent-water mixtures. Another response from a different facility indicated that a 2.6 million gallon waste that had been identified as an organic sludge was actually a solvent-water mixture that had been treated in an impoundment. This waste had also been counted a second time as being disposed of in a landfill. Two additional wastes treated in impoundments had also been double-counted (the second time as being disposed of in landfills). Therefore, the quantities of the landfilled wastes were removed from the survey data and the physical-chemical form description of the first waste in the impoundment was changed to a solvent-water mixture. All changes in physical-chemical form descriptions were made to the appropriate wastes in the survey data. The physical-chemical form descriptions for several other wastes were confirmed based on these facility responses. The data reported in this section reflect all of these changes made to the 1981 RIA Mail Survey. Refer to Table 1-2 of Appendix A for further detail.

In addition, several changes resulted from a modification to the default physical-chemical form assigned to those waste streams for which no additional description was provided in the RIA survey. The default for spent solvent wastes should have been the code for organic liquid; however, the wastes were coded as having a default code of "0", signifying unknown or undescribed physical-chemical form. EPA believes that assuming the undescribed waste quantities are organic liquids is more consistent with the type of wastes identified as the basis for listing these solvent wastes as hazardous. Spent solvents and still bottoms usually are pumpable organic liquids. This modified assumption increases the estimated quantity of organic liquids by approximately 15 million gallons/year, and reduces the solvent-water estimate by an equal amount. This quantity represents a total of six wastes at two facilities. This error has been corrected in the data base, the wastes have been recoded, and the reanalysis of the survey data includes these recoding changes. Refer to Table 1-3 of Appendix A for further detail.

The fourth change was in the methodology for estimating the quantity of solvent wastes treated or stored in surface impoundments that require alternative treatment or recycling capacity. In the proposed rule, EPA assumed that surface impoundments accounting for approximately 80 percent of the volume of wastes treated in surface impoundments will continue to operate under RCRA Section 3005(j)(11)(A) and (B). EPA now estimates that all of the solvent waste treated (or treated and stored) in surface impoundments will require alternative treatment capacity on an interim basis. This estimation is consistent with the economic impact assessment prepared in support of this rule and is based on the economic feasibility of meeting the requirements set forth in Section 3005(j)(11)(A) and (B). EPA has maintained from the proposed rule that all of the solvent waste stored in surface impoundments are being stored for purposes of subsequent treatment or disposal in existing units, and therefore, then would not require additional alternative treatment capacity.

Based on these assumptions, EPA estimates that of the total of 2,848.9 million gallons of solvent waste per year that is land disposed, 309.2 million gallons are stored solely in surface impoundments and will not require any alternative offsite treatment or recycling capacity, 2,485.4 million gallons are being treated (or concurrently treated and stored) in surface impoundments and will require interim alternative capacity while the facilities make adjustments to comply with Section 3005 (j)(11)(A) and (B); and 54.3 million gallons are being disposed of in landfills, waste piles, disposal impoundments, and land application units and will require long-term alternative capacity. Therefore, the estimated total quantity requiring alternative capacity (whether interim or long-term) is 2,539.7 million gallons per year (excluding all solvent wastes from Small Quantity Generators, CERCLA actions, and RCRA corrective actions.

5. SUMMARY OF LAND DISPOSED SOLVENT WASTES AFFECTED BY THE FINAL RULE

The proposed rule estimated that 32.1 million gallons of solvent wastes were being landfilled per year. Of this quantity, 1.34 million gallons of solvent wastes identified as "U" or "P" wastes were removed from the estimate. The 4.3 million gallons of waste that had been double-counted as also being treated in an impoundment, were deleted from the estimate of landfilled waste quantity. Mixed solvent wastes added 18.3 million gallons of waste to the total. Changes in the physical/chemical form descriptions from undescribed wastes to organic liquids added 14.8 million gallons more of organic liquids. The revised estimate of the total quantity landfilled became 44.7 million gallons per year. Of this quantity, 24.1 million gallons were described as spent solvents or organic liquids, 5.06 million gallons were identified as still bottoms or organic sludges, and 15.6 million gallons were identified a mixtures of solvents and inorganic sludges or solids (such as biotreatment sludge or wastewater treatment sludge).

All of 0.001 million gallons of solvent wastes identified in the proposed rule as being land applied were wastes identified with "U" or "P" waste codes. Therefore, for today's rule, EPA estimates that there are no F001 through F005 solvent wastes being land applied on an annual basis.

0.743 million gallons of solvents wastes were identified as being stored in waste piles. There were no changes to this quantity for today's rule. Spent solvents or organic liquids accounted for 0.013 million gallons, and still bottoms or organic sludges accounted for 0.730 million gallons of the total quantity.

According to the proposed rule, surface impoundments being used only as storage impoundments contained 318.2 million gallons of solvent wastes. Of this quantity, 8.99 million gallons were identified as "U" or "P" wastes and were removed from the total quantity estimate. There were no adjustments due to additional mixed solvent wastes. For today's rule, the adjusted total quantity estimate for these impoundments was 309.2 million gallons per year. As outlined in the proposed rule, all of this waste has been estimated as going to existing alternative treatment or disposal capacity.

According to the proposed rule, the total quantity of solvent wastes identified as being disposed of in impoundments was 8.79 million gallons. The contribution from "U" and "P" wastes was only 0.008 million gallons. No other adjustments were necessary, with the total quantity now at 8.78 million gallons for today's rule. Spent solvents and organic liquids accounted for 2.64 million gallons, and mixtures with inorganic sludges accounted for 6.14 million gallons.

Surface impoundments being used for treatment, or treatment and storage, contained 841.9 million gallons of solvent wastes, according to the proposed rule. Of this, only 0.833 million gallons were identified as "U" or "P" wastes and were removed form the total quantity estimate. For today's rule, the total quantity estimated as being treated in impoundments became 2,485.4 million gallons. The largest change came from an increase of 1,644 million gallons of additional mixed solvent wastes. All of these were identified as solvent-water mixtures. Analysis of one facility response resulted in the recoding of one waste originally identified as an organic liquid to a solvent-water mixture. This waste had a volume of 28.3 million gallons. Of the total quantity treated in impoundments, 2,481 million gallons were identified as solvent-water mixtures, 0.452 million gallons were identified as spent solvents or organic liquids, and 4.30 million gallons were identified as still bottoms or organic sludges. The quantity of these wastes identified as being stored, as well as being treated in the impoundments, was 2,097 million gallons.

PART C

EVALUATION OF REQUIRED TREATMENT AND RECYCLING CAPACITY

The waste groups affected by this final rulemaking were identified and characterized in detail in Part B. The appropriate alternative treatment or recycling technologies for each waste group were presented in the Best Demonstrated Available Technology (BDAT) Background Document for this final rule. This section presents an analysis of the alternative treatment and recycling capacity that will be required by the solvent waste groups banned from land disposal by this final rulemaking.

Given a particular waste type, there are several treatment and recycling options available to a hazardous waste generator that can be used as alternatives to land disposal. Therefore, it is impossible to predict precisely what treatment technologies any of the numerous generators will choose as an alternative to land disposal. The factors that will influence selection of treatment or recycling technology are both technical and economic. The cost of applying a specific technology to waste are facility-specific, depending on the characteristics and volume of the waste generated and on the proximity of commercial treatment and recycling facilities. As a result, the analysis given here will primarily consider the technical feasibility of applying available technologies to specific waste groups. Economics are only considered implicitly, in that the capacity of technologies currently available to treat hazardous wastes is influenced by the relative economic feasibility.

In the discussions that follow, the waste groups have been assigned to a given treatment or recycling technology based on the information presented in Part B of this document, and in the BDAT Background Document. Information obtained from the Industry Studies Data Base (ISDB) is also used to select appropriate treatment technologies for the waste groups.

The Agency recognizes that the actual application of a technology to a specific solvent waste can be dependent upon characteristics such as the total concentration of solvents, halogens, metals, water, and the heating value of the waste. For the purposes of assigning treatment and/or recycling capacity to solvent wastes covered in today's rule, the following assumptions were made about the wastes that were described in the 1981 data base: (1) wastes specifically identified as spent solvents were assumed to be less contaminated with other materials than those identified as organic liquids or those that received the default description of organic liquids, (2) wastes identified as still bottoms were assumed to be less contaminated than those identified as organic sludges, and (3) those wastes identified as waste paint (interpreted to be organic liquids) and those identified as paint sludge (interpreted to be organic sludges) were assumed to be as contaminated or more contaminated than the other solvent wastes.

Alternative treatment and/or recycling technologies were assigned, incorporating these assumptions along with an estimation of the halogen content of the waste. Options were then assigned for each category of waste based on the various combinations of physical/chemical form descriptions and halogen content as discussed above.

EPA has evaluated three major alternative technologies for the solvent wastes identified as spent solvents, organic liquids, still bottoms, or organic sludges. These are distillation, reuse as a fuel substitute, and incineration. Insufficient waste characterization data exist for wastes that were land disposed in 1981 to positively assign one given technology to each waste. For the purposes of estimating capacity for each of these technologies, each solvent waste within a given waste group was assigned an equal probability of being assigned to each applicable technology. Waste groups were established based on the descriptions of the wastes land disposed in 1981. These include the categories of spent solvents, organic liquids, waste paint, still bottoms, organic sludge, and paint sludge. Applicable technologies were selected based on the potential for complications due to the anticipated degree of contamination, physical form, and halogen content of the wastes. The quantity of wastes was then divided equally among the most likely options. If only one of the alternative technologies was considered applicable, the entire quantity was assigned to that technology. If two technologies were applicable, the total quantity was split in half, with half being assigned to each. If all three were considered applicable, the quantity was split in thirds.

EPA has evaluated several technologies for the solvent wastes identified as solvent-water mixtures, as discussed in greater detail in the following section.

1. SOLVENT-WATER MIXTURES

As discussed in Part B, solvent-water mixtures are aqueous mixtures containing less than one percent total organic content or total solvent concentration. An estimated 2.48 billion gallons of solvent-water mixtures land disposed each year will be affected by the land disposal restrictions and will require alternative management.

Based on the characteristics described in Part B, solvent-water mixtures are amenable to one or more of the following wastewater treatment technologies described in the BDAT Background Document: biological treatment, carbon and resin absorption, steam stripping, chemical oxidation, or some combination of these methods. Each of these technologies can achieve BDAT levels for some waste streams.

Because of the low total organic content, solvent-water mixtures are not amenable to fuel substitution or reclamation. They may be incinerated, but are likely to require blending with wastes of higher heat content or an auxiliary fuel source. Data obtained from the ISDB, presented in Table C-1, demonstrate that mean solvent concentrations for reclamation are approximately 40 percent (Ref. 4). Similarly, the low organic content indicates that the heat value of this waste is inadequate for fuel substitution. This is also demonstrated in Table C-1, which shows that the mean solvent concentration of wastes used as fuel substitutes is 37 percent. The most viable treatment option for

Table C-1. Waste Solvent Management Practices From The Industry Studies Data Base[a] (Ref. 4)

Waste Management Technique	Number of Reported Waste Streams	Quantity of Wastes (Million gallons per year)	Mean Total Solvent Concentration[b] (Percent)
Fuel substitution for industrial boilers	61	61.2	37
Discharge of Surface Waters	108	2,580	0.31
Discharge to POTW	93	341	1.2
Treated at a commercial facility (TSDF)	16	165	26
Incineration	157	36.0	28
Landfill	91	39.8	7.4
Stored or treated in on-site tanks[c]	120	1,590	0.71
Reclamation	136	413	40
Surface Impoundments	101	2,130	0.30
Injection Well	61	442	5.6

[a] Compilation of data for wastes containing the solvent constituents for F001, F002, F003, F004, and F005 waste codes.

[b] All concentrations are prior to any treatment.

[c] May include some counting of waste streams discharged to surface waters.

solvent-water mixtures is wastewater treatment in tanks*, discussed below in greater detail.

a. Wastewater Treatment

As stated previously, the solvent-water waste group identified in the RIA questionnaire information is predominantly water (over 99 percent). As discussed in the BDAT Background Document, the most viable option for managing solvent-water mixtures is some form of wastewater treatment.

This is also supported by ISDB information which shows that solvent waste streams discharged as wastewaters (i.e., to surface waters and POTWs) have mean solvent concentrations of approximately one percent or less. A summary of these data is presented in Table C-1.

The demonstrated wastewater treatment technologies for solvent water mixtures are biological treatment, steam stripping, and carbon adsorption, as discussed in the BDAT Background Document. Other technologies such as chemical oxidation and resin adsorption, are not widely demonstrated, but are capable of achieving BDAT treatment performance levels for some solvent wastes.

Solvent-water mixtures can be treated by many different combinations of wastewater treatment technologies sequenced in various process trains taking place in tanks. The choice of treatments will depend on specific waste characteristics and economic factors. There are currently insufficient data to determine precisely the volumes of wastes that would require any of these specific wastewater treatment technologies. Because these data are currently unavailable, it is impossible to determine the future capacity needs for these specific wastewater treatment technologies. For the purpose of determining capacity needs in this document, the solvent-water mixtures of less than one percent total organics are grouped into one treatability group of wastes, all of which require some form of wastewater treatment in tanks.

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*All wastewater treatment methods are defined generically as tank treatment.

2. ORGANIC LIQUIDS

Almost 40 percent of the 27.2 million gallons identified as organic liquids are described as spent solvents. Such waste streams are assumed to be amenable to various management practices such as distillation for solvent recovery and reuse, destruction through incineration, and destruction through fuel substitution. Furthermore, it is demonstrated that these treatment technologies have been utilized to manage spent solvents. Each technology is discussed in greater detail below.

a. Distillation

Distillation is a suitable method of separation for volatile liquid organics and for aqueous solutions containing volatile liquid organics. The boiling points of the components of the mixture must be separated by 20°C to 30°C. Substances with low boiling points are more economical to distill because less heat is required. In addition, mixtures of substances with vastly different volatilities are easier to separate by distillation than are mixtures of substances with similar volatilities.

Given these constraints, the primary reason that more of the 27.2 million gallons of spent solvents classified as organic liquids are not recovered through distillation appears to be economics. Among existing options for managing spent solvents, land disposal is usually less costly than recovering solvents through distillation. The economic cut-off depends on the concentration and mixtures of solvents in the waste liquid. As noted above, because of the heat input required for distillation, waste streams currently reclaimed by distillation generally contain solvent concentrations high enough to offset the recovery cost.

According to the ISDB (refer to Table C-1), the mean concentration of solvent wastes reclaimed through distillation appears to be 40 percent. Further evaluation of the raw data shows a solvent concentration range of 0.4 percent to 98 percent. At the lower end, it is likely that the waste stream is being reclaimed to recover other constituents that are present at much higher concentrations. Nonetheless, current and future regulatory and economic incentives will make distillation a more attractive alternative for the management of organic liquids.

A second reason that distillation is not currently more widely used is the practice of commingling different solvents. In cases where there is no economic incentives to distill and recover solvent wastes, generators often commingle several different solvents. When solvents are commingled, their recovery becomes much more difficult. Commingled solvents preclude the use of the relatively simple and inexpensive binary distillation units. The single equilibrium stage provided by these units does not allow for the separation and recovery of more than two compounds, normally water and one solvent. More complicated and expensive fractional distillation columns are required to accomplish the separation and recovery of multiple solvents from a single waste stream.

Greater volumes of solvent waste may be recovered by distillation if the waste management practices of generators are altered to prevent commingling. For example, if solvent wastes 1,1,1-trichloroethylene and trichloroethylene are mixed together in a waste stream, pot distillation, commonly used to reclaim a single solvent constituent, cannot be used to recover the individual solvents. Furthermore, although recovered 1,1,1-trichloroethylene or trichloroethylene alone may be sold for over $2.00 per gallon, a recovered mixture of these solvents has little or no resale value.

b. Fuel Substitution

A second alternative to land disposal for organic liquids is fuel substitution. For a waste stream to be useful as a fuel substitute, it must meet certain criteria for two important waste characteristics: heating value and halogen content. For a facility to utilize a solvent waste as an alternative fuel, that waste must contain sufficient heating value so that consumption of primary fuel is not required. An EPA survey of industrial boilers, cement kilns, and aggregate kilns found that most facilities specify that wastes burned as fuel are acceptable when the heating value is between 10,000 and 18,000 Btu/lb (Ref. 7).

Analysis of data from the RIA for the Incinerator Regulations demonstrates that if the heating value of solvent waste incinerated was above 10,000 Btu/lb, the sum of the noncombustibles totalled less than 30 percent (Figures C-1 and C-2). Much of the 27.2 million gallons of organic liquid is characterized as used, highly concentrated spent solvent. It is anticipated that a significant portion of these waste streams will contain greater than 70 percent organics and meet the heating value criterion necessary for use of a waste as an alternative fuel.

Examination of the ISDB (refer to Table C-1) reveals that the mean solvent concentration in wastes used as auxiliary fuels in industrial boilers is 37 percent. Solvent concentrations in the individual wastes range from 0.4 percent to 80.5 percent. At the lower end of this range, the waste stream is typically blended with other fuels so that the overall heat value is acceptable. This practice is more common when the solvent waste is used as a fuel substitute by the generator.

Not only will chlorine affect the heating value of a waste, but it may reduce the particulate matter control efficiency of electrostatic precipitators (Ref. 9), present a corrosion problem for industrial boilers (Ref. 12), or contaminate the product (e.g., cement kilns) (Ref. 8). As a result, the chlorine content and degree of contamination of wastes used as fuel in these devices is often quite limited. For industrial boilers, this limit is about 3 percent; for cement kilns it is

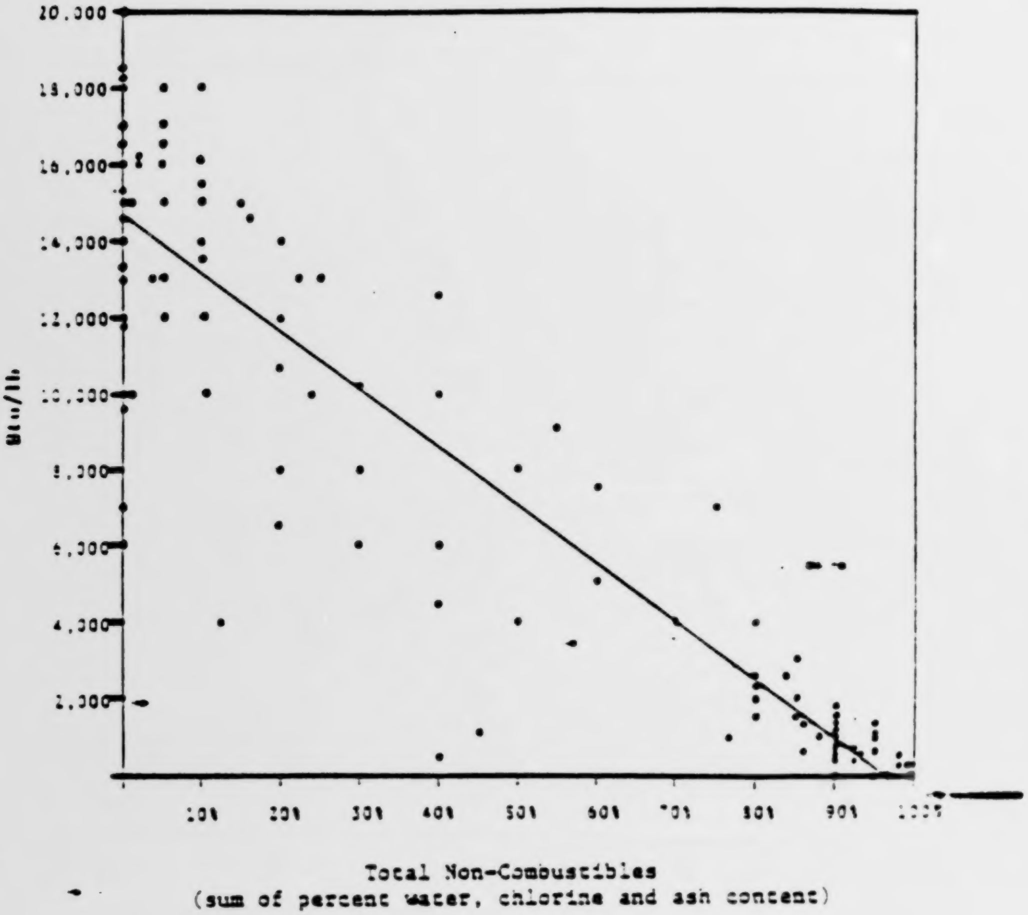

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FIGURE C-1

DISTRIBUTION OF Btu CONTENT vs. TOTAL NON-COMBUSTIBLES FOR INCINERATED NONHALOGENATED SOLVENT WASTES

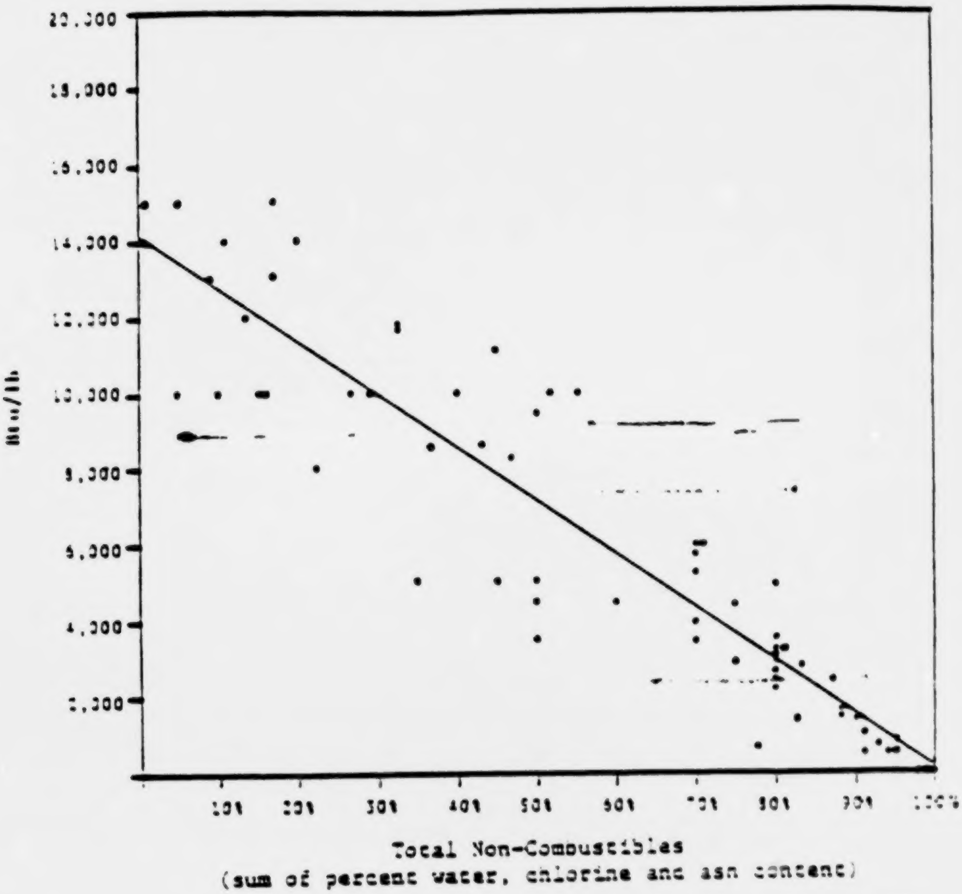

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FIGURE C-2

DISTRIBUTION OF Btu CONTENT vs. TOTAL NON-COMBUSTIBLES FOR INCINERATED HALOGENATED SOLVENT WASTES

5 percent (Ref. 7). Given these constraints, the nonhalogenated organic liquids are the preferred choice for fuel substitution. This is further evidenced by the fact that only two of the 61 waste streams reported in ISDB as being used as fuel in boilers were halogenated. Of the 27.2 million gallons of organic liquid wastes, 55 percent are reported to be nonhalogenated.

The remaining halogenated wastes can also be reused as a fuel substitute, provided the chlorine content is below 3 to 5 percent. Because most organic liquids contain high concentrations of solvents, it is unlikely the chlorine content of the halogenated organic liquid wastes will meet this criterion. However, halogenated solvent wastes are often blended with nonhalogenated wastes (or fuel) to specific total halogen levels for burning in cement kilns. The halogen content is actually considered desirable to certain levels (i.e., less than 5 percent) and contributes to the process chemistry.

C. Incineration

Data from the ISDB, shown in Table C-1, demonstrate that even waste streams of very low heat value can be destroyed using incineration technology. Additional data from the Regulatory Impact Analysis for the Incinerator Regulations show that wastes containing 0.1 to 80 percent solvent have been destroyed using incineration technology (Ref. 6). A summary of these data is presented in Figures C-3 and C-4. These figures present graphically the heat value, in Btu's per pound, of incinerated

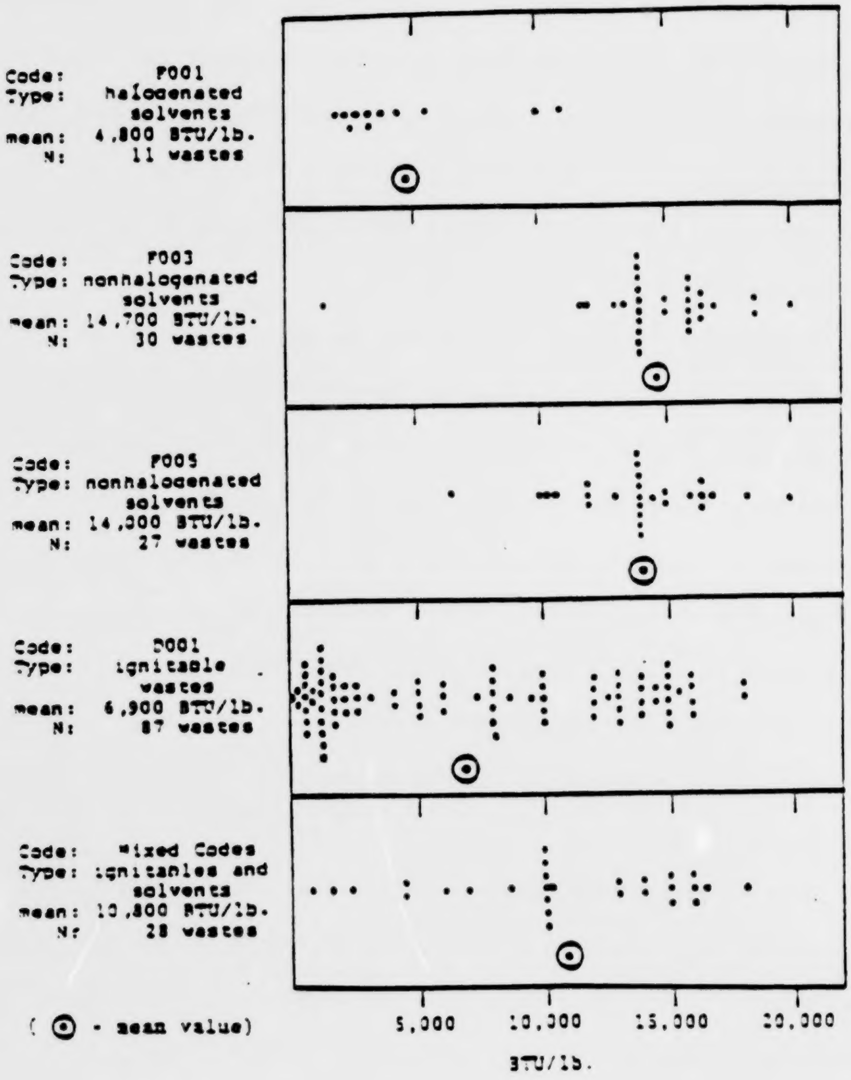

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FIGURE C-3

DISTRIBUTION OF Btu CONTENT BY WASTE CODES
FOR 183 INCINERATED RCRA WASTES

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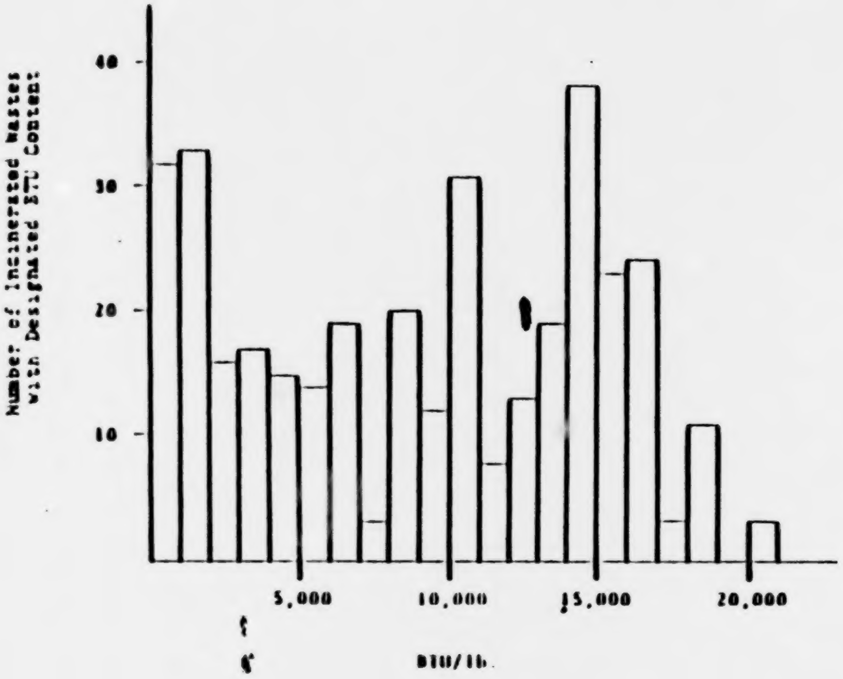

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FIGURE C-4

DISTRIBUTION OF Btu CONTENT FOR 354 INCINERATED RCRA WASTES

RCRA wastes. In Figure C-3, the data are presented by waste code. Waste codes F001, F003, F005, and D001 and mixed codes are represented. The data points available for waste codes F002 and F004 were too few in number to be considered statistically significant. The figures indicate that wastes of widely varying heat content are incinerated. Of special note are ignitable wastes (coded D001), which have a mean heat value of only 6,900 Btu/lb.

As shown in Figures C-3 and C-4, the heat and noncombustible content of a given waste is not as restrictive a characteristic for incineration technology as it is for fuel substitution. In fact, approximately 31 facilities in the Incineration RIA report (Ref. 6) destroyed wastes with a heat content less than 1,000 Btu/lb. Figure C-4 illustrates that even low Btu, halogenated organic solvents are incinerated.

Compared to the more dilute solvent-water mixtures, organic liquids are more amenable to destruction through incineration because of their higher organic content. In many cases, their heat value is high enough so that little auxiliary fuel is required to maintain sufficient temperatures for complete destruction. The requirement for auxiliary fuel, of course, depends largely on such factors as the ash, chlorine, and water content of the waste as discussed above. In addition, because they are pumpable, organic liquids can be injected into an incinerator under highly turbulent conditions, promoting more complete combustion and destruction.

d. Summary of Capacity Requirements for Organic Liquids

Of the 27.2 million gallons of RIA wastes described as spent solvents or organic liquids, 10.2 million gallons were described as spent solvents, and 0.8 million gallons as waste paint. Halogenated solvent waste codes (containing F001 or F002 or any mixtures containing either of these wastes) accounted for 12.3 million gallons, and 14.9 million gallons were nonhalogenated waste codes (containing F003, F004, and/or F005 or any mixtures thereof). Treatment alternatives for these spent solvents or organic liquids are dependent upon the halogen content of the physical-chemical description of the waste. Halogenated solvents are typically recovered by distillation, incinerated, or blended with other wastes to reduce halogen content and then used as a fuel substitute. The nonhalogenated solvents are recovered by distillation, used as a fuel substitute, or incinerated, depending on the extent of contamination.

EPA has estimated that distillation is applicable only to those solvent wastes specifically identified as spent solvents. This is primarily based on the assumption that these wastes are the least contaminated of all the solvent wastes. The halogenated solvents should be more economically attractive to distill than the nonhalogenated spent solvents, because of their relatively higher resale/market value. However, nonhalogenated solvents that are relatively uncontaminated are also distillable. EPA believes that the probability of the halogenated spent solvents being distilled versus the probability of nonhalogenated spent solvents being distilled.cannot be determined based on the waste descriptions that were provided. Therefore, EPA has assumed that there is an equal probability of distilling the halogenated and the nonhalogenated spent solvents. Wastes described as other organic liquids and waste paint were estimated to be too contaminated to be distilled.

EPA estimates that reuse as a fuel substitute is a viable alternative for all fluid solvent wastes specifically identified as spent solvents or organic liquids, but not for those identified as waste paint. The halogen content of these wastes will determine whether the solvent waste is used primarily for its fuel content or for its halogen content. The fuel value of solvent wastes decreases as the halogen content and degree of contamination increase. Generally, the nonhalogenated solvents have considerably higher heating value and thus have a higher probability of being used as a fuel. However, EPA believes that it is not possible to determine the probability of halogenated or nonhalogenated solvent wastes being used as fuel substitutes based on the waste descriptions that were provided. Therefore, EPA has assumed that there is an equal probability of using the nonhalogenated versus the halogenated solvent wastes for fuel.

Incineration in hazardous waste incinerators is the third alternative for these solvent wastes. Incineration can be used for any of these solvent wastes, but is typically only necessary for those wastes that are highly contaminated with other materials. Limitations on halogen content often exist because of corrosion problems and effects on air pollution control devices. In spite of those limitations, there is generally an equal probability of halogenated and nonhalogenated solvent wastes being incinerated.

3. ORGANIC SLUDGES AND SOLIDS

As discussed in Part B, of the estimated 10.1 million gallons of organic sludges and solids generated per year, 5.15 million gallons were described as still bottoms/residues and 0.05 million gallons as paint sludge. In addition, approximately 0.48 million gallons of still bottoms will be generated by distillation of the organic liquids discussed above. This generation rate for still bottoms is based upon data gathered through a survey of the Small Quantity Generators. These data indicate that approximately 14 percent of the input to distillation leaves as a residue (5). Of the total quantity of organic sludges and solids, (approximately 10.6 million gallons), 6.64 million gallons are halogenated and 3.92 million gallons are nonhalogenated.

Data from the ISDB characterizing these wastes indicate that they are most amenable to incineration and fuel substitution. Both of these technologies are discussed below with respect to organic sludges and solids.

a. Fuel Substitution

The preceding discussion identified the critical waste characteristics that will limit the use of organic liquids as fuel substitutes. These same characteristics, as well as viscosity and solids content, will affect the applicability of organic sludges and solids to fuel substitution. The fuel handling systems for boilers and industrial kilns are capable of handling liquids (fuel oil) and/or granulated solids (coal). High viscosity sludges (greater than 23 stokes) are not pumpable and therefore not compatible with the liquid injection units used to feed fuel oil.

Viscosity, solids content, and heat content information is not available for the 10.1 million gallons of organic sludges and solids; therefore, it is not possible to predict the quantity of this material that will be used for fuel substitution. However, use of such wastes for fuel substitution is practiced. In a telephone survey performed for the Agency, 29 facilities operating solvent recovery operations reported using the residuals for fuel substitution (Ref. 1). Further examination of these data show that the residuals containing nonhalogenated solvents are more likely to be used as fuel substitutes than the residuals containing halogenated solvents. Blending may be required to reduce halogen content to acceptable levels prior to use for fuel substitution.

b. Incineration

Commercial incinerators are capable of destroying highly viscous, halogenated wastes. Furthermore, the fact that these wastes are used as auxiliary fuels indicates they have sufficient heat content to be incinerated with a minimum of auxiliary fuel.

Rotary kiln, fixed hearth, multiple hearth, and fluidized bed incinerators are capable of destroying viscous wastes that are not compatible with liquid injection units. In addition, commercial incinerators are refractory-lined to minimize corrosion due to halogens. Finally, commercial incinerators are not subject to product quality constraints as is the case with industrial furnaces and kilns.

c. Summary of Capacity Requirements for Organic Sludges

Treatment alternatives for the organic sludge wastes are dependent upon the physical-chemical form of the waste. Many of these wastes are residues generated from distillation. Wastes identified as still bottoms, organic sludges, and paint sludges were assumed to have high solids content, which would interfere with the distillation process. EPA estimates that distillation would not be an alternative for any of these wastes.

Reuse as a fuel substitute is an applicable technology for all solvent wastes identified as still bottoms. Those wastes identified only as organic sludges are assumed to be more highly contaminated than the still bottoms. EPA estimates that the wastes described as halogenated organic sludges (excluding still bottoms) contain a combination of contaminants and total halogens which would preclude its use as a fuel substitute. Although nonhalogenated organic sludges are anticipated to be more contaminated than the corresponding still bottoms, EPA estimates that the lower total halogen content would make them acceptable for reuse as fuel. Paint sludges are considered too contaminated for this alternative.

Incineration is the second viable option for organic sludges. Incineration can be used for any of the solvent wastes, but it is estimated that incineration is generally used only for those wastes that are highly contaminated with other materials. EPA estimates that incineration is the only option for wastes described as halogenated organic sludges (excluding still bottoms) and paint sludge, because of the combination of contamination and halogen content.

4. INORGANIC SLUDGES

Part B explained that an estimated 21.7 million gallons of solvent wastes described as inorganic sludges are currently land disposed. Because of the undeterminable variety of potential waste matrices for these derived solvent wastes, the Agency has assumed a worst case scenario that some form of incineration would be required in order to meet the treatment levels previously established. Because the majority of these derived solvent wastes were described as resembling primarily inorganic sludge, the Agency estimated that rotary kiln incineration would be required for the 21.7 million gallons of derived solvent waste.

5. SUMMARY OF CAPACITY REQUIREMENTS

Waste solvents comprise four waste groups that will require alternative treatment or recycling capacity if banned from land disposal: solvent-water mixtures, organic liquids, organic sludges and solids, and inorganic sludges and solids. For each of these waste groups, the volume of solvent waste requiring treatment or recycle capacity was estimated for the following technologies: commercial incineration, distillation, fuel substitution, and wastewater treatment.

Based on the quantities presented in Part B and the assumptions presented in the previous section, EPA estimates that the 10.18 million gallons of those solvent wastes described as spent solvents would be split evenly among distillation, fuel substitution, and incineration (approximately 3.39 million gallons each). All of the 0.83 million gallons of waste described as waste paint has been estimated to be directed to incineration. The 16.18 million gallons of those wastes only described as organic liquids were estimated to be split evenly between incineration and fuel substitution (8.09 million gallons each).

EPA estimates that the 5.14 million gallons of those solvent wastes described as still bottoms would be split evenly between incineration and fuel substitution (2.57 million gallons each). All of the 0.05 million gallons of wastes described as paint sludges and the 2.87 million gallons of those wastes described as halogenated organic sludges were estimated to be directed to incineration. The 2.02 million gallons of wastes described only as nonhalogenated organic sludges were estimated to be split evenly between incineration and fuel substitution (1.01 million gallons each).

EPA estimates that 1.48 million gallons of nonhalogenated and 1.91 million gallons of halogenated spent solvents would be directed to distillation. This would result in an increased generation of 0.21

million gallons of nonhalogenated still bottoms and 0.27 million gallons of halogenated still bottoms per year. EPA estimates that these wastes would be split evenly between incineration and fuel substitution (approximately 0.24 million gallons each). Therefore, the estimate of total quantity of solvent wastes requiring alternative treatment capacity includes these still bottoms. All of the solvent-inorganic sludge mixtures were estimated to require incineration, and all of the solvent-water mixtures were estimated to require some form of wastewater treatment in tanks.

The total volume of RIA solvent wastes requiring treatment and recycling capacity is summarized in Table C-2; these quantities, distributed by required alternative treatment or recycling capacity, are shown in Table C-3.

Table C-2. Total Volume of RIA Solvent Wastes Requiring Treatment and Recycling Capacity

(million gallons per year)

Waste description	D-field code	Halogenated	Nonhalogenated	Total
Organic liquids:				
-- not otherwise specified	400	5.714	10.466	16.180
-- spent solvents	401	5.743	4.440	10.183
-- waste paint	408	0.822	0.004	0.826
Total		12.28	14.91	27.19
Organic sludges:				
-- not otherwise specified	500	2.870	2.017	4.887
-- still bottoms/residues	502	3.495	1.650	5.145
-- paint sludge	505	0	0.050	0.050
Total		6.365	3.717	10.08
Inorganic sludges/solids:				
-- not otherwise specified	100	0	0.275	0.275
-- metal hydroxide sludge	201	5.054	0	5.054
-- wastewater treatment sludge	202	15.362	0	15.362
-- biotreatment sludge	203	0.941	0	0.941
-- filter cakes	206	0	0.103	0.103
Total		21.36	0.378	21.74
Solvent-water mixtures:				
-- wastewater	301	187.495	646.213	833.71
-- scrubber waters	306	1,644.352	2.608	1,646.96
Total		1,831.85	648.82	2,480.7
TOTAL:		1,871.9	667.8	2,539.7

Table C-3. Required Treatment and Recycling Capacity for Solvent Wastes
(million gallons per year)

Waste description	Incineration		Distillation (recovery)	Fuel substitution	Wastewater treatment
	Liquid	Solid			
Halogenated organic liquids:					
-- not otherwise specified	2.857	NA	NA	2.857	NA
-- spent solvents	1.914	NA	1.914	1.914	NA
-- waste paint	0.822	NA	NA	NA	NA
Nonhalogenated organic liquids:					
-- not otherwise specified	5.233	NA	NA	5.233	NA
-- spent solvents	1.480	NA	1.480	1.480	NA
-- waste paint	0.004	NA	NA	NA	NA
Halogenated organic sludges:					
-- not otherwise specified	2.870	NA	NA	NA	NA
-- still bottoms/residues	1.747	NA	NA	1.747	NA
Nonhalogenated organic sludges:					
-- not otherwise specified	1.009	NA	NA	1.009	NA
-- still bottoms/residues	0.825	NA	NA	0.825	NA
-- paint sludge	0.050	NA	NA	NA	NA
Inorganic sludges/solids (mixture rules)	NA	21.74	NA	NA	NA
Solvent-water mixtures:	NA	NA	NA	NA	2,480.7
Total RIA wastes	18.8	21.7	3.39	15.1	2,480.7
Residuals*					
-- halogenated	0.134	NA	NA	0.134	NA
-- nonhalogenated	0.104	NA	NA	0.104	NA
TOTAL	19.0	21.7	3.39	15.3	2,481

NA = not an applicable technology

* Still bottoms will be generated through distillation of the 1.914 million gallons of halogenated organic liquid and 1.480 million gallons of nonhalogenated organic liquid. Based on data collected in the SQG survey, 14 percent of the distillation input is removed as still bottoms (5). This factor is used to account for still bottoms that will be generated when the organic liquids are recycled.

PART D

ASSESSMENT OF AVAILABLE TREATMENT AND RECYCLING CAPACITY

Four basic management practices were identified as the best demonstrated available technologies (BDAT) for solvent wastes. Each of these technologies is considered a viable alternative to land disposal of solvent wastes:

1. Treatment in tanks (biological, steam stripping, carbon adsorption);
2. Incineration;
3. Fuel substitution; and
4. Distillation for solvent recovery.

For the proposed rule, estimates of available commercial capacity were developed based on best available information. At that time, EPA recognized the limitations of the existing data bases and was working to develop a new national data base. To obtain the needed data, EPA designed a national survey of hazardous waste management facilities to be conducted in two parts. The National Screening Survey, conducted in the spring of 1986, was designed to collect information on the operating status, commercial status, size, and types of hazardous waste management practices at all RCRA treatment, storage, and disposal (TSD) facilities. This was to be followed by a more detailed survey in 1987, to obtain additional information from a statistical sample of facilities that responded to the Screening Survey.

Because many commenters to the proposed rule expressed concern about the available capacity estimates, EPA decided to use the initial results from the Screening Survey to re-evaluate available capacity. Those facilities who responded to the survey and listed incineration, reuse as fuel, biological wastewater treatment, and wastewater treatment operations for solvents, and who also identified themselves as commercially available, were chosen for follow-up. Because of the time constraints imposed on EPA's response to comments, the data gathering effort was a limited to telephone verification and clarification of information provided in the Screening Survey. The new information was used for development of national estimates for available commercial capacity.

The evaluation of available treatment and recycling capacity does not include private solvent treatment and recycling facilities. Data are not available to determine the extent to which private facilities will manage additional solvent waste in the future. It is not known how many owners/operators of noncommercial treatment and recycling facilities also land disposed solvent waste that will be banned, nor is there information on the quantity of such land disposed waste. Thus, the analysis presented below includes only the capacity of commercial facilities.

In general, information concerning any future treatment facilities that are being planned, but have not yet initiated operations, is very limited: therefore, only existing on-line facilities were included in the capacity estimates.

1. TANK TREATMENT CAPACITY

For the proposed rule, three sources of information on national tank treatment capacity were considered: (1) The EPA's National Mail Survey of Hazardous Waste Generators and TSD Facilities Regulated Under RCRA in 1981, known as the RIA Mail Survey; (2) The Hazardous Waste Data Management System (HWDMS); and (3) The RCRA Biennial Reports Data Base.

The Biennial Reports Data Base gives the total number of RCRA-regulated treatment facilities, but does not identify for each facility the type of treatment, the waste treated, or the treatment capacity. Therefore, this data base was not used in estimating tank treatment capacity for today's rule.

HWDMS contains information from Part A and Part B of the RCRA treatment, storage, and disposal facility permit applications submitted to the EPA. Although the Part A applications list all of the waste codes managed, the capacities reported include both existing and planned capacity. This capacity is not an accurate indication of either actual design capacity or unused capacity. Part B applications give actual design capacity; however, many currently regulated tank treatment facilities are operating under interim status and have not yet submitted Part B applications to EPA. Therefore, the data from HWDMS were also not used for tank treatment capacity estimates.

The RIA Mail Survey provided the best available estimates of design capacity, percent utilization, and waste codes for treated wastes at individual commercial facilities. In the case of tank treatment, however, the questionnaire was not designed to report the capacity available to treat waste by specific tank treatment methods. For the proposed rule, the RIA Mail Survey was the only source of available data on tank treatment capacity at commercial facilities that treat solvent wastes. The available capacity was estimated by performing a facility-by-facility analysis and summing the results to obtain a national estimate. For each commercial facility with tank treatment of solvent wastes, the available capacity was estimated by subtracting the annual used capacity from the total design capacity for all tank treatment. However, some of the facilities that treat solvents also treat other types of wastes such as those containing metals. Consequently, for the proposed rule the RIA Mail Survey results provided a maximum estimate of unused capacity for the treatment of solvent waste. The actual unused capacity available for solvents would be somewhat less than the maximum.

For today's final rule, consideration of the information collected during the 1986 National Screening Survey allowed the data base to be updated in two ways. First, it provided more recent (than 1981) capacity data, and second, it provided information from which the capacity by individual treatment method (i.e., biological, carbon adsorption, and steam stripping) could be estimated. The Screening Survey data base identified the facilities who indicated that they conduct commercial wastewater treatment of solvent wastes. These facilities were further screened with a follow-up telephone survey to clarify the information needed to calculate capacity estimates (Ref. 16).

Table D-1 presents the national estimates for each selected treatment technology. The capacity shown under biological treatment is from one extremely large commercial facility that offers a combination of biological treatment and carbon adsorption. The steam stripping capacity represents one commercial facility that offers steam stripping. Two other commercial facilities offer carbon adsorption for solvent wastes. The available capacities are the sum of the individual facility capacities.

2. INCINERATION CAPACITY

For the proposed rule, unused commercial incineration capacity was estimated by three independent methods, the results of which agreed reasonably well with each other. The value used for the proposed rule, i.e., 25.6 million gallons per year, was one of these estimates. At the time of the proposal, this estimate was considered to be the most current and complete of the three. Data sources for this estimate included telephone contacts with owners/operators of commercial incinerators, site visit reports, the RIA Mail Survey, RCRA permit data, and HWDMS.

As of January 1986, prior to the proposed rule, available information indicated that there were 17 commercial incineration units in the United States located at 14 facilities operated by 11 firms. The volume of waste incinerated and the thermal capacity of these facilities were uniformly converted using the following assumptions:

1. The average heat content for a combustible waste is 8,000 Btu/lb (Ref. 1),
2. The capacity utilization is 80 percent (Refs. 1, 10),

Table D-1. Commercially Available Unused Capacity for Wastewater Treatment of Solvent Wastes

Treatment technology	Available capacity (million gallons per year)
Biological treatment	2,100.0
Steam stripping	0.0478
Carbon adsorption	2.94
Total	2,103.0

3. The average available operating time of a commercial incinceration unit is 83 percent (7,270 hours/yr) (Ref. 14), and
4. The average weight of the combustible waste is the source as that of water, 8.34 pounds per gallon (Ref. 10).

Using the above conversion factors, the available capacity at these 14 facilities was estimated to be a maximum of 25.6 million gallons per year.

Some commenters to the proposed rule stated that incineration capacity was limited to a very few commercial facilities and that available capacity would not be adequate for the restricted solvent wastes. In response to these concerns, EPA used the results of the Screening Survey and telephone follow-up to verify the commercial status of incinerator facilities and to re-evaluate the capacity at commercial facilities.

The data from the survey show that the number of commercial incineration facilities has decreased from 14 to 12 commercial facilities. Of the 14 commercial incinerator facilities included in the incineration capacity analysis for the proposed rule, three no longer offer commercial incinerator services. However, one other facility now offers commercial incineration services. Furthermore, four of these facilities plan to have addtional new commercial incinerators operating in 1987, two companies plan to begin using two existing incinerators for commercial operation, and one company plans to complete construction of a new large incinerator facility in 1987. None of the facilities indicated that they planned to close in 1987. Based on the new data, EPA concludes that the Agency's estimate of the number of commercial incinerator facilities is reasonable, and that the number of commercial incinerator facilities will remain fairly constant or may increase over the next two years. EPA believes that even if an existing commercial incinerator facility does close, based on the above data, it is reasonable to assume that another facility will begin operation of a new commercial incinerator.

Using the new information, along with data available for the proposed rule, available commercial capacity estimates were developed. The available incineration capacity was estimated by summing the capacities for each of the commercial facilities nationwide. The information available and the amount of information varied for each incinerator. For example, the utilization was calculated by dividing the actual hours of operation by the maximum operating schedule, not the total number of hours in a year. Alternatively, utilization was calculated by dividing the actual amount of waste incinerated by the maximum amount of waste that could be incinerated annually, if such information was available. If utilization information was not available, it was assumed to be 80 percent.

Based on the available information, the best estimate for available incineration capacity ranges from 23 to 33 million gallons per year for liquid hazardous waste. The analysis of incineration capacity, including data sources, methodology, and facilities estimates, are presented in a report prepared for EPA's Office of Solid Waste, entitled Thermal Treatment Background Information to Support Land Disposal Restrictions (Ref. 17).

The range for available capacity results from use of alternative methods for calculating facility capacity and reflects the inevitable variability of capacity from one facility to the next. The available capacity at a facility is a function of various waste stream characteristics and operating parameters; thus, with limited data for each facility, alternative methods indicate a range for available national capacity. Since no one method is preferred, the Agency decided that the midpoint of the range was the most appropriate national estimate for available capacity. Therefore, EPA estimates that the unused national capacity for commercial incineration is 28 million gallons per year.

Because there will be an increased demand for incineration capacity for CERCLA wastes not covered by this rule (i.e., wastes other than F001 through F005), not all of the estimated 28 million gallons per year capacity will be available for the restricted solvent wastes. Data from site analyses conducted by EPA show the increased demand for off-site commercial incineration of non-solvent CERCLA wastes that will require capacity to be 5.4 million gallons per year (refer to Appendix C). Therefore, the available incineration capacity for the restricted solvent wastes is reduced to approximately 22.6 million gallons per year.

3. FUEL SUBSTITUTION

The use of a hazardous solvent waste as an auxiliary fuel in an industrial process is a viable option for managing that waste. This option is called fuel substitution. For the proposed rule, the Agency did not estimate the quantity of unused fuel substitution capacity because adequate data were not available.

After the rule was proposed, the 1986 National Screening Survey data base was searched to identify those facilities that have potential fuel substitution capacity. In the original survey, these facilities had responded that they conduct "reuse as fuel" for spent solvent hazardous wastes and that they were commercial facilities. These facilities were contacted with a follow-up telephone survey to obtain information on their operating status, amount and type of waste burned in 1985, and the amount that could have been burned (Ref. 16). From the responses, the Agency determined that at least 20 facilities burn hazardous waste and that capacity is available at these facilities for approximately 24 million gallons per year of hazardous solvent waste to be burned as an auxiliary fuel. Because many other facilities recycle hazardous waste as fuel, and because the ones contacted were a subset of all the facilities that conduct fuel substitution, the overall national capacity is estimated to be higher than the 24 million gallons per year. The Agency has decided not to extrapolate these estimates further.

4. SOLVENT RECYCLING CAPACITY

An estimate of the commercial recycling capacity was obtained through a telephone survey of the members of the National Association of Solvent Recyclers (NASR) (Ref. 1). According to NASR, their 43 members represent approximately 70 percent of the commercial recycling capacity available in the United States.

The telephone survey involved contacting each recycler and asking a series of questions concerning facility operations. The following information requested during the survey was used to determine recycling capacity:

1. The volumes and types of solvent managed by "F" hazardous waste code designation;
2. The type of recycling process; and
3. The process capacity.

Additionally, information on marketing area, product yield, and still bottom disposal methods was obtained.

At the completion of the survey effort, 34 of the 43 members had responded. Data and information were obtained for 31 facilities where solvent recycling capacity and production by waste solvent group were known. These data were compiled by EPA Region. Subsequently, the data were extrapolated proportionally to cover the remaining NASR firms and the remaining 30 percent of the nationwide recycling capacity.

The principal method of solvent recycling reported is distillation.

Based on data obtained during the telephone survey, it was estimated that approximately 375 million gallons per year of commercial distillation capacity exist in the United States. It was also estimated that each year, approximately 150 million gallons of spent solvents undergo reclamation by commercial distillation. Thus, about 225 million gallons per year of unused commercial distillation capacity exist.

5. SUMMARY OF AVAILABLE CAPACITY

The four technologies identified as the best demonstrated available technologies (BDAT) as alternatives to land disposal of restricted solvent wastes, the solvent waste groups to which they are applicable, and the estimates of unused (available) capacity are shown below:

Treatment recovery technology	Solvent waste group	Unused capacity (million gallons per year)
Wastewater treatment (in tanks)	Solvent-water mixtures	2,103.0
Incineration	Organic liquids Organic sludges Inorganic sludges or solids	22.6
Fuel substitution	Organic liquids Organic sludges	>24.0
Distillation	Organic liquids	225.0

PART E
BIBLIOGRAPHY

Cross-reference of the Bibliography of this Background Document for the Solvents Final Rule to the Federal Register Notice and Document Number in the Public Docket

Reference	Federal Register notice	Document number
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2. U.S. Environmental Protection Agency. 1984. *National Survey of Hazardous Waste Generators and Treatment, Storage, and Disposal Facilities Regulated Under RCRA in 1981*. EPA/530-SW-005, GPO Pub. #5/N055-000-00239-8.	January 14, 1986	116*
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7. Westat. 1985. *Data Base for the Survey of Handlers and Burners of Used or Waste Oil and Waste - Derived Fuel Material*. Prepared for Office of Solid Waste, Economics and Policy Analysis Branch. Washington, D.C.: U.S. Environmental Protection Agency.	January 11, 1985	17**
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13. Johnson JC. The Dow Chemical Company, Midland, MI. 1985. Vapor Degreasing. Metal Finishing Guidebook Directory.	January 14, 1986	265
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15. Hearn R. 1986. Memorandum to Dave Pepson. Summary of a Follow-Up Survey of Plants that Treat Spent Solvents in Surface Impoundments. Prepared by Radian Corporation for Office of Solid Waste. Washington, DC: U.S. Environmental Protection Agency. July 22, 1986.	New reference	NA
16. Pope-Reid Associates, Inc. and Radian Corporation. 1986. Telephone Verification Survey of Commercial Facilities that Manage Solvents. U.S. Environmental Protection Agency, Office of Solid Waste.	September 5, 1986	
17. Mitre. 1986. Thermal Treatment Background Information to Support Land Disposal Restrictions. Washington, D.C.: U.S. Environmental Protection Agency. Contract No. (P.O.) 6W-3121-NASA. Working Paper-86W00405.	New reference	NA

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*References with document numbers above 116 have not been published in the Federal Register, but correspond to the notice of January 14, 1986.

**Referred to as the "Methodology" report in FR January 11, 1985.

NA - Not applicable

APPENDIX A

Documentation Supporting Estimates of the Volumes of Solvent Wastes Handled by Various Management Practices

Attachment 1 - Computer Printout of Solvent Waste Volumes from the RIA Mail Survey

Attachment 2 - Accounting of Solvent Waste Volumes Presented

Attachment 3 - Halogenated and Nonhalogenated Solvent Mixed Waste Streams ("X" Waste Codes)

APPENDIX A

Documentation Supporting Estimates of the Volumes of Solvent Wastes Handled by Various Management Practices

The Background Document presents an overview of waste solvent generation and management practices. Volume II of the Background Document presents the quantities and characteristics of solvent wastes land disposed, based on data collected by the RIA Mail Survey. This appendix provides further documentation of the waste solvent quantity estimates provided in Volume II.

Several changes have been made to the proposed rule and to the RIA Mail Survey data base that affect the wastes being regulated, their volumes, and the distribution of the wastes into waste groups requiring alternative capacity. Table 1-1 presents waste streams that are now included in the analysis because of the decision by the Agency to consider the wastes that were mixtures of F001, F002, F003, F004, and/or F005 with other nonsolvent hazardous wastes. Table 1-2 presents changes made to the physical form of several wastes based on a follow-up telephone survey of facilities reported in the RIA Mail Survey as treating spent solvent wastes in surface impoundments. Table 1-3 presents changes to solvent volumes and physical form descriptions to correct (1) coding errors in the RIA data base or (2) double-counting errors when wastes were reported handled by more than one land disposal method.

Table 1-1. Solvent Wastes Mixed with other Nonsolvent RCRA Hazardous Wastes

Facility ID	Waste code*	Weighted volume (gallons)	D-field code	Land disposal method
PRD090028101	X042	275,466	100	Landfill
NJD002385730	X067	15,212,765	202	Landfill
MID000810408	X021	2,010,975	500	Landfill
MID000810408	X022	823,531	500	Landfill
SCD048373468	X173	1,644,351,582	301	Treatment and storage in surface impoundment

*Refer to Tables 3-1 and 3-2 in Appendix A, Attachment 3, for further identification on reported multiple waste codes applicable to the wastes.

Table 1-2. Results of a Follow-Up Survey of Facilities Reported in the 1981 RIA Mail Survey to Treat Spent Solvents in Surface Impoundments

Facility ID	Waste code	Weighted volume (gallons)	D-field code Old	D-field code New	Land disposal method	Changes made based on response to follow-up
TXD008079212	F005	445,336,634	301	301	Treatment and storage in surface impoundment	Confirmed physical form (D-field) and waste code.
TXD008079212	F005	2,608,400	306	306	Treatment and storage in surface impoundment	Confirmed physical form (D-field) and waste code.
VAD003122165	F003	28,280,168	400	301	Treatment in surface impoundment	Changed physical form from organic liquid (400) to wastewater (301). Volumes likely to be lower, but cannot quantify; do not change.
NCD001810365	F002	5,054,217	201	201	Disposal in surface impoundment	Confirmed physical form and waste code. Volumes lower, but cannot quantify; do not change.
NCD001810365	F002	148,661	202	202	Disposal in surface impoundment	Confirmed physical form and waste code. Volumes lower, but cannot quantify; do not change.
NCD001810365	F002	940,953	203	203	Disposal in surface impoundment	Confirmed physical form and waste code. Volumes lower, but cannot quantify; do not change.
IND050530872	X018	2,580,668	500	301	Treatment in surface impoundment	Changed physical form from organic sludge (500) to wastewater (301). Volumes previously double-counted in landfill and impoundment. Dropped from landfill.

Table 1-2. (Continued)

Facility ID	Waste code	Weighted volume (gallons)	D-field code Old	D-field code New	Land disposal method	Changes made based on response to follow-up
IND050530872	F005	605,725	502	502	Landfill	None
CAD041835695	F003	103,041	206	206	Landfill	None
LAD043426006	F001	184,914,070	301	301	Treatment in surface impoundment	None
OHD020273819	F001	486,867	500	500	Treatment and storage in surface impoundment	None
OHD020273819	F002	3,495,442	502	502	Treatment and storage in surface impoundment	None
OHD020273819	F003	209,283	502	502	Treatment and storage in surface impoundment	None

Source: Hearn, B. 1986. Memorandum to Dave Pepson. Summary of a Follow-Up Survey of Plants that Treat Spent Solvents in Surface Impoundments. Prepared by Radian Corporation, for the Office of Solid Waste. Washington, DC: U.S. Environmental Protection Agency. July 22, 1986 (Ref. 15).

Table I-3. Changes to Solvent Waste Descriptions and Volumes Due to Coding Errors or Double-Counting in the RIA Data Base

Facility ID	Waste code	Weighted volume (gallons)	D field code Old	D field code New	Land disposal method	Changes made to correct coding or double-counting errors
MIT270010044	F001	0	0	400	Treatment and storage in surface impoundment	Assumed a physical form of organic liquid (400) rather than undescribed waste as default code. No volumes reported.
MIT270010044	F002	0	0	400	Treatment and storage in surface impoundment	Assumed a physical form of organic liquid (400) rather than undescribed waste as default code. No volumes reported.
MIT270010044	F003	0	0	400	Treatment and storage in surface impoundment	Assumed a physical form of organic liquid (400) rather than undescribed waste as default code. No volumes reported.
MIT270010044	F005	0	0	400	Treatment and storage in surface impoundment	Assumed a physical form of organic liquid (400) rather than undescribed waste as default code. No volumes reported.
MID048090633	F005	9,301,747	0	400	Landfill	Assumed a physical form of organic liquid (400) rather than undescribed waste as default code.
MID048090633	F002	5,541,237	0	400	Landfill	Assumed a physical form of organic liquid (400) rather than undescribed waste as default code.

Table 1-3. (Continued)

Facility ID	Waste code	Weighted volume (gallons)	D-field code		Land disposal method	Changes made to correct coding or double-counting errors
			Old	New		
IND050530872	X018*	2,580,668	500	301	Treatment in surface impoundment	Dropped volume from landfill, double-counted.
ALD000622464	F005	928,917	401	same	Disposal in surface impoundment	Dropped volume from landfill, double-counted.
ALD000622464	F001	821,884	408	same	Disposal in surface impoundment	Dropped volume from landfill, double-counted.

*Changes to this waste stream were noted previously in Table 1-2.

Attachment 1 to this appendix is a computer printout listing all pertinent solvent waste volume data collected by the RIA Mail Survey. The attached printout is comprised of two parts. The first consists of six pages of SAS computer code that established the format of the reported data. The second part consists of 64 pages of data.

Data pertaining to the following waste management practices can be found on the pages of the printout indicated below (page numbers are located in the upper right hand corner of each page):

- Disposal in landfills - pp. 1-18
- Utilization of surface impoundments - pp. 19-58
- Disposal in waste piles - pp. 59-64

The first page of data for each waste management practice provides a summary of data on that management practice. The summary data are presented in 18 columns reading left to right across the page. Each row of data pertains to a specific waste stream. The first column indicates the observation number; each record listed on the summary table is numbered sequentially. The facility identification number for each record is presented in column 2. The hazardous waste code is shown in column 3; additional information on mixed wastes is provided in columns 8 through 15. The actual volume of waste handled in gallons is indicated in column 4. Column 5 provides the statistical weighting factor for each record based on a statistical evaluation of the distribution of the survey responses compared to the distribution of the actual universe of generators and treatment, storage, and disposal facilities. Listed in column 6 is the weighted volume of waste solvent handled. The D-field code for each record, which indicates the nature of the waste, is provided in column 7. D-field codes are as follows:

D-Field Code	Waste Form
000 series	Unknown or undescribed
100 series	Inorganic solids
200 series	Inorganic sludges
300 series	Solvent-water mixtures
400 series	Organic liquids
500 series	Organic sludges/solids
600 series	Miscellaneous

The data presented on the printout summary page for each waste management practice have been used to develop Tables 2-1 through 2-6, which are presented in Attachment 2 of this memorandum. Each table (a) is followed by a second table (b) presenting an accounting of each identified waste stream that contributed to the total volumes presented on the respective tables.

Many of the solvent waste streams identified by the RIA mail survey were reported as mixed wastes. If a mixed waste consisted of both halogenated and nonhalogenated solvent constituents, it was classified as a halogenated waste for the purpose of the waste volume analysis. Wastes listed as containing waste codes F001 and F002 consist of halogenated solvent wastes. Wastes listed as containing waste codes F003, F004, and F005 consist of nonhalogenated solvent wastes. Tables 3-1 and 3-2 in Attachment 3 of this appendix provide further identification of which "X" code designation has been assigned to mixed waste streams when multiple waste codes are applicable to the waste.

ATTACHMENT 1

COM[illegible]TER PRINTOUT OF SOLVENT WASTE VOLUMES
[illegible]ROM THE RIA MAIL SURVEY

```
1         SAS(R) LOG   OS SAS 5.08          MVS/XA JOB SIX91    STEP A0856C   PROC SAS                    14:18 TUESDAY, JULY 29, 1986

NOTE: COPYRIGHT (C) 1984 SAS INSTITUTE INC., CARY, N.C.  27511, U.S.A.
NOTE: THE JOB SIX91 HAS BEEN RUN UNDER RELEASE 5.08 OF SAS AT THE ENVIRONMENTAL PROTECTION AGENCY (01189001).

NOTE: CPUID   VERSION = 20  SERIAL = 170189  MODEL = 3090 .
      CPUID   VERSION = 20  SERIAL = 270189  MODEL = 3090 .

NOTE: SAS OPTIONS SPECIFIED ARE:
       SORT=4

1              TITLE2 'PREPARED BY OPRA, REQUEST NUMBER  A0856C';                    00000160
2              TITLE3 'DATA SOURCE: RIA MAIL SURVEY TSD GENERAL VERSION 3';          00000170
3              TITLE4 'SOLVENT CATAGORY 1';                                          00000180
4            DATA ONE;                                                               00000190
5            SET TG3.T17R TG3.XT17R (READ=XXXXX);                                    00000200
6               IF T17H = 'F001' OR T17H = 'F002' OR T17H = 'F003' OR T17H = 'F004'  00000210
7               OR T17H = 'F005'                                                     00000220
8               OR T17H = 'X001' OR T17H = 'X002' OR T17H = 'X003' OR T17H = 'X004'  00000230
9               OR T17H = 'X013' OR T17H = 'X016' OR T17H = 'X018'                   00000240
10              OR T17H = 'X035' OR T17H = 'X038' OR T17H = 'X057' OR T17H = 'X058'  00000250
11              OR T17H = 'X064' OR T17H = 'X071' OR T17H = 'X073'                   00000260
12              OR T17H = 'X074' OR T17H = 'X079' OR T17H = 'X083' OR T17H = 'X225'  00000270
13              OR T17H = 'X089' OR T17H = 'X090' OR T17H = 'X095' OR T17H = 'X223'  00000280
14              OR T17H = 'X103' OR T17H = 'X104' OR T17H = 'X069'                   00000290
15              OR T17H = 'X113' OR T17H = 'X121'                                    00000300
16              OR T17H = 'X127' OR T17H = 'X139' OR T17H = 'X150' OR T17H = 'X161'  00000310
17             OR T17H = 'X179' OR T17H = 'X008' OR T17H = 'X021' OR T17H = 'X022'   00000330
18              OR T17H = 'X042' OR T17H = 'X048' OR T17H = 'X067' OR T17H = 'X070'  00000331
19              OR T17H = 'X078' OR T17H = 'X088' OR T17H = 'X096' OR T17H = 'X099'  00000332
20              OR T17H = 'X100' OR T17H = 'X108' OR T17H = 'X112' OR T17H = 'X123'  00000333
21              OR T17H = 'X148' OR T17H = 'X168' OR T17H = 'X169' OR T17H = 'X173'  00000334
22              OR T17H = 'X175' OR T17H = 'X178' OR T17H = 'X185' OR T17H = 'X186'  00000335
23              OR T17H = 'X194' OR T17H = 'X197' OR T17H = 'X203' OR T17H = 'X215'  00000336
24              OR T17H = 'X222' OR T17H = 'X224' OR T17H = 'X236';                  00000337
25           IF T17ZD = 0 THEN CATEGORY = 'A';                                       00000340
26           IF T17ZD GE 100 AND T17ZD LE 199 THEN CATEGORY = 'B';                   00000350
27           IF T17ZD GE 200 AND T17ZD LE 299 THEN CATEGORY = 'C';                   00000360
28           IF T17ZD GE 300 AND T17ZD LE 399 THEN CATEGORY = 'D';                   00000370
29           IF T17ZD GE 400 AND T17ZD LE 499 THEN CATEGORY = 'E';                   00000380
30           IF T17ZD GE 500 AND T17ZD LE 599 THEN CATEGORY = 'F';                   00000390
31           IF T17ZD GE 600 AND T17ZD LE 699 THEN CATEGORY = 'G';                   00000400
32           KEEP FCID TWGHT T17A T17W T17I T17C T17F T17J T17G T17D T17CC1-T17CC8   00000410
33                T17ZD CATEGORY;                                                    00000420
34                                                                                   00000430

NOTE: DATA SET WORK.ONE HAS 1250 OBSERVATIONS AND 20 VARIABLES. 326 OBS/TRK.
NOTE: THE DATA STATEMENT USED 0.49 SECONDS AND 532K.

                                                                                     00000440
35           PROC FORMAT;                                                            00000450
36              VALUE $SI
NOTE: FORMAT $SI HAS BEEN OUTPUT.
37                 100 = 'SURFACE IMPOUNDMENT DISPOSAL ONLY'                         00000460
38                 010 = 'SURFACE IMPOUNDMENT STORAGE ONLY'                          00000470
39                 001 = 'SURFACE IMPOUNDMENT TREATMENT ONLY'                        00000480
40                 110 = 'DISPOSAL AND STORAGE IN SI'                                00000490
41                 101 = 'TREATMENT AND DISPOSAL IN SI'                              00000500
42                 011 = 'TREATMENT AND STORAGE IN SI'                               00000510
43                 111 = 'TREATMENT, STORAGE, AND DISPOSAL IN SI';                   00000520
44              VALUE $CAT                                                           00000530
```

```
NOTE: WARNING! MODULE $CAT IS ALREADY ON THE LIBRARY.
NOTE: FORMAT $CAT HAS BEEN OUTPUT.                                  00000540
45              A = 'D-FIELD = 0'                                   00000550
46              B = 'D-FIELD = 100 TO 199'                          00000560
47              C = 'D-FIELD = 200 TO 299'                          00000570
48              D = 'D-FIELD = 300 TO 399'                          00000580
49              E = 'D-FIELD = 400 TO 499'                          00000590
50              F = 'D-FIELD = 500 TO 599'                          00000600
51              G = 'D-FIELD = 600 TO 699';                         00000610
52
NOTE: THE PROCEDURE FORMAT USED 0.09 SECONDS AND 716K.
                                                                    00000620
53         DATA  X2 X3 X4 X5 X6;                                    00000630
54         SET ONE;                                                 00000640
55                                                                  00000650
56            IF T17J = 2 OR T17J = 7 OR T17J = 10 THEN DO;         00000660
57               VOLUME = T17I;                                     00000670
58            IF VOLUME < 0 THEN VOLUME = T17A;                     00000680
59               HVOLUME = VOLUME * THGHT;                          00000690
60               OUTPUT X2;                                         00000700
61            END;                                                  00000710
62                                                                  00000720
63            IF T17J = 4 OR T17J = 6 OR T17J = 9 OR T17J = 10 THEN DO;  00000730
64               VOLUME = T17I;                                     00000740
65            IF VOLUME < 0 THEN VOLUME = T17A;                     00000750
66               HVOLUME = VOLUME * THGHT;                          00000760
67               OUTPUT X3;                                         00000770
68            END;                                                  00000780
69                                                                  00000790
70            IF T17J = 5 THEN DO;                                  00000800
71               VOLUME = T17I;                                     00000810
72            IF VOLUME < 0 THEN VOLUME = T17A;                     00000820
73               HVOLUME = VOLUME * THGHT;                          00000830
74               OUTPUT X4;                                         00000840
75            END;                                                  00000850
76               FORMAT DST $SI. CATEGORY $CAT. T17ZD T17G T17J T17D;  00000860
77               LABEL FCID = 'FACILITY ID'                         00000870
78                     T17H = 'HCODE'                               00000880
79                     T17I = 'VOLUME'                              00000890
80                     T17C = 'VOLUME'                              00000900
81                     T17F = 'VOLUME'                              00000910
82                    THGHT = 'WEIGHT'                              00000920
83                  HVOLUME = 'HEIGHT VOLUME'                       00000930
84                  T17ZD = 'D-FIELD'                               00000940
85                      T17G = 'T17G'                               00000950
86                      T17D = 'T17D'                               00000960
87                      T17J = 'T17J'                               00000970
88                 T17CC1 = 'CC1'                                   00000980
89                T17CC2 = 'CC2'                                    00000990
90                T17CC3 = 'CC3'                                    00001000
91                T17CC4 = 'CC4'                                    00001010
92               T17CC5 = 'CC5'                                     00001020
93               T17CC6 = 'CC6'                                     00001030
94               T17CC7 = 'CC7'                                     00001040
95               T17CC8 = 'CC8';                                    00001050
96                                                                  00001060
97                                                                  00001070
98            DISP = '0'; STORE = '0'; TREAT = '0';
```

```
99          IF T17J = 3 OR T17J = 6 OR T17J = 7 THEN DISP = '1';                    00001080
100         IF T17D = 3 OR T17D = 7 OR T17D = 10 OR T17D = 11 OR T17D = 12          00001090
101            OR T17D = 13 OR T17D = 15 OR T17D = 17 THEN STORE = '1';             00001100
102         IF T17G = 2 OR T17G = 5 OR T17G = 7 OR T17G = 10 OR T17G = 11 OR        00001110
103            T17G = 12 THEN TREAT = '1';                                          00001120
104         IF DISP = '1' OR STORE = '1' OR TREAT = '1' THEN DO;                    00001130
105            DST = DISP||STORE||TREAT;                                            00001140
106            IF DST = '100' THEN VOLUME = T17I;                                   00001150
107            IF DST = '010' THEN VOLUME = T17C;                                   00001160
108            IF DST = '001' THEN VOLUME = T17F;                                   00001170
109            IF DST = '110' THEN VOLUME = MAX(T17C,T17I);                         00001180
110            IF DST = '101' THEN VOLUME = MAX(T17F,T17I);                         00001190
111            IF DST = '011' THEN VOLUME = MAX(T17C,T17F);                         00001200
112            IF DST = '111' THEN VOLUME = MAX(T17C,T17F,T17I);                    00001210
113         IF VOLUME < 0 THEN VOLUME = T17A;                                       00001220
114            HVOLUME = VOLUME * THGHT;                                            00001230
115            OUTPUT X5;                                                           00001240
116         END;                                                                    00001250
117                                                                                 00001260
118       IF T17D = 4  OR T17D = 8 OR T17D = 9 OR T17D = 12                         00001270
119         OR T17D = 15 OR T17D = 16 OR T17D = 17 THEN DO;                         00001280
120         VOLUME = T17C;                                                          00001290
121         IF VOLUME < 0 THEN VOLUME = T17A;                                       00001300
122         HVOLUME = VOLUME * THGHT;                                               00001310
123         OUTPUT X6;                                                              00001320
124       END;                                                                      00001330
125                                                                                 00001340

NOTE: MISSING VALUES WERE GENERATED AS A RESULT OF PERFORMING
      AN OPERATION ON MISSING VALUES.
      EACH PLACE IS GIVEN BY: (NUMBER OF TIMES) AT (LINE):(COLUMN).

      4 AT 111:36   6 AT 114:17

NOTE: DATA SET WORK.X2 HAS 29 OBSERVATIONS AND 26 VARIABLES. 268 OBS/TRK.
NOTE: DATA SET WORK.X3 HAS 0 OBSERVATIONS AND 26 VARIABLES. 268 OBS/TRK.
NOTE: DATA SET WORK.X4 HAS 0 OBSERVATIONS AND 26 VARIABLES. 268 OBS/TRK.
NOTE: DATA SET WORK.X5 HAS 49 OBSERVATIONS AND 26 VARIABLES. 268 OBS/TRK.
NOTE: DATA SET WORK.X6 HAS 3 OBSERVATIONS AND 26 VARIABLES. 268 OBS/TRK.
NOTE: THE DATA STATEMENT USED 0.18 SECONDS AND 616K.

126         PROC SORT DATA = X2; BY T17ZD DESCENDING HVOLUME;                       00001350

NOTE: DATA SET WORK.X2 HAS 29 OBSERVATIONS AND 26 VARIABLES. 268 OBS/TRK.
NOTE: THE PROCEDURE SORT USED 0.29 SECONDS AND 1196K.

                                                                                    00001360
127         PROC PRINT LABEL;                                                       00001370
128            VAR FC10 T17W VOLUME THGHT HVOLUME T17ZD T17CC1-T17CC8 T17G T17D     00001380
129                T17J;                                                            00001390
130                TITLE5 'T17J = 2 OR T17J = 7 OR T17J = 9';                       00001400
131                TITLE6 '** SORT BY T17ZD **';
NOTE: THE PROCEDURE PRINT USED 0.08 SECONDS AND 736K AND PRINTED PAGE 1.

                                                                                    00001410
132         PROC UNIVARIATE; VAR VOLUME; WEIGHT THGHT; BY CATEGORY;
NOTE: THE PROCEDURE UNIVARIATE USED 0.07 SECONDS AND 744K AND PRINTED PAGES 2 TO 6.
                                                                                    00001420
133         PROC SORT DATA = X2; BY T17W DESCENDING VOLUME;
```

```
NOTE: DATA SET WORK.X2 HAS 29 OBSERVATIONS AND 26 VARIABLES. 268 OBS/TRK.
NOTE: THE PROCEDURE SORT USED 0.28 SECONDS AND 1156K.

134          PROC PRINT LABEL;                                                     00001430
135             VAR FCID T17W VOLUME TWGHT WVOLUME T17ZD T17CC1-T17CC8 T17G T17D   00001440
136                 T17J;                                                          00001450
137                 TITLE5 'T17J = 2 OR T17J = 7 OR T17J = 10';                    00001460
138                TITLE6 '** SORT BY T17W **';                                    00001470
NOTE: THE PROCEDURE PRINT USED 0.08 SECONDS AND 736K AND PRINTED PAGE 7.

139          PROC UNIVARIATE; VAR VOLUME; WEIGHT TWGHT; BY T17W;                   00001480
140                                                                                00001490
NOTE: THE PROCEDURE UNIVARIATE USED 0.09 SECONDS AND 744K AND PRINTED PAGES 8 TO 18.

141          PROC SORT DATA = X3; BY T17ZD DESCENDING WVOLUME;                     00001500

NOTE: NO OBSERVATIONS TO BE SORTED.
NOTE: DATA SET WORK.X3 HAS 0 OBSERVATIONS AND 26 VARIABLES. 268 OBS/TRK.
NOTE: THE PROCEDURE SORT USED 0.05 SECONDS AND 5000K.

142          PROC PRINT LABEL;                                                     00001510
143             VAR FCID T17W VOLUME TWGHT WVOLUME T17ZD T17CC1-T17CC8 T17G T17D   00001520
144                 T17J;                                                          00001530
145                 TITLE5 'T17J = 4 OR T17J = 6 OR T17J = 9 OR T17J = 10';        00001540
146                 TITLE6 '** SORT BY T17ZD **';                                  00001550
NOTE: NO OBSERVATIONS IN DATA SET WORK.X3 .
NOTE: THE PROCEDURE PRINT USED 0.05 SECONDS AND 736K.

147          PROC UNIVARIATE; VAR VOLUME; WEIGHT TWGHT; BY CATEGORY;               00001560
NOTE: NO OBSERVATIONS IN DATA SET WORK.X3 .
NOTE: THE PROCEDURE UNIVARIATE USED 0.06 SECONDS AND 744K.

148          PROC SORT DATA = X3; BY T17W DESCENDING WVOLUME;                      00001570

NOTE: NO OBSERVATIONS TO BE SORTED.
NOTE: DATA SET WORK.X3 HAS 0 OBSERVATIONS AND 26 VARIABLES. 268 OBS/TRK.
NOTE: THE PROCEDURE SORT USED 0.05 SECONDS AND 5000K.

149          PROC PRINT LABEL;                                                     00001580
150             VAR FCID T17W VOLUME TWGHT WVOLUME T17ZD T17CC1-T17CC8 T17G T17D   00001590
151                T17J;                                                           00001600
152                TITLE5 'T17J=4 OR T17J=6 OR T17J=9 OR T17J=10';                 00001610
153                TITLE6 '** SORT BY T17W **';                                    00001620
NOTE: NO OBSERVATIONS IN DATA SET WORK.X3 .
NOTE: THE PROCEDURE PRINT USED 0.05 SECONDS AND 736K.

154          PROC UNIVARIATE; VAR VOLUME; WEIGHT TWGHT; BY T17W;                   00001630
155                                                                                00001640
NOTE: NO OBSERVATIONS IN DATA SET WORK.X3 .
NOTE: THE PROCEDURE UNIVARIATE USED 0.05 SECONDS AND 744K.

156          PROC SORT DATA = X4;                                                  00001650
157            BY T17ZD DESCENDING WVOLUME;                                        00001660

NOTE: NO OBSERVATIONS TO BE SORTED.
NOTE: DATA SET WORK.X4 HAS 0 OBSERVATIONS AND 26 VARIABLES. 268 OBS/TRK.
NOTE: THE PROCEDURE SORT USED 0.05 SECONDS AND 5000K.
```

```
158          PROC PRINT LABEL;                                                         00001670
159             VAR FCID T17H VOLUME THGHT HVOLUME T17ZD T17CC1-T17CC8 T17G T17D      00001680
160                  T17J;                                                             00001690
161                  TITLE5 'T17J = 5';                                                00001700
162                 TITLE6 '** SORT BY T17ZD **';                                      00001710
NOTE: NO OBSERVATIONS IN DATA SET WORK.X4 .
NOTE: THE PROCEDURE PRINT USED 0.05 SECONDS AND 736K.

163          PROC UNIVARIATE; VAR VOLUME; WEIGHT THGHT; BY CATEGORY;                   00001720
NOTE: NO OBSERVATIONS IN DATA SET WORK.X4 .
NOTE: THE PROCEDURE UNIVARIATE USED 0.05 SECONDS AND 744K.

164          PROC SORT DATA = X4;                                                      00001730
165            BY T17H DESCENDING HVOLUME;                                             00001740

NOTE: NO OBSERVATIONS TO BE SORTED.
NOTE: DATA SET WORK.X4 HAS 0 OBSERVATIONS AND 26 VARIABLES. 268 OBS/TRK.
NOTE: THE PROCEDURE SORT USED 0.05 SECONDS AND 5000K.

166          PROC PRINT LABEL;                                                         00001750
167             VAR FCID T17H VOLUME THGHT HVOLUME T17ZD T17CC1-T17CC8 T17G T17D      00001760
168                  T17J;                                                             00001770
169                  TITLE5 'T17J = 5';                                                00001780
170                 TITLE6 '** SORT BY T17H **';                                       00001790
NOTE: NO OBSERVATIONS IN DATA SET WORK.X4 .
NOTE: THE PROCEDURE PRINT USED 0.05 SECONDS AND 736K.

171          PROC UNIVARIATE; VAR VOLUME; WEIGHT THGHT; BY T17H;                       00001800
172                                                                                    00001810
NOTE: NO OBSERVATIONS IN DATA SET WORK.X4 .
NOTE: THE PROCEDURE UNIVARIATE USED 0.05 SECONDS AND 744K.

173          PROC SORT DATA = X5; BY DST T17ZD DESCENDING HVOLUME;                     00001820

NOTE: DATA SET WORK.X5 HAS 49 OBSERVATIONS AND 26 VARIABLES. 268 OBS/TRK.
NOTE: THE PROCEDURE SORT USED 0.37 SECONDS AND 1196K.

174          PROC PRINT LABEL;                                                         00001830
175             BY DST;                                                                00001840
176             VAR FCID T17H VOLUME THGHT HVOLUME T17ZD T17CC1-T17CC8 T17G T17D      00001850
177                  T17J;                                                             00001860
178                  TITLE5 '** SORT BY T17ZD **';                                     00001870
179                  TITLE6;                                                           00001880
NOTE: THE PROCEDURE PRINT USED 0.12 SECONDS AND 736K AND PRINTED PAGES 19 TO 20.

180          PROC UNIVARIATE; VAR VOLUME; WEIGHT THGHT; BY DST  CATEGORY;              00001890
NOTE: THE PROCEDURE UNIVARIATE USED 0.10 SECONDS AND 744K AND PRINTED PAGES 21 TO 35.

181          PROC SORT DATA = X5; BY DST T17H DESCENDING HVOLUME;                      00001900

NOTE: DATA SET WORK.X5 HAS 49 OBSERVATIONS AND 26 VARIABLES. 268 OBS/TRK.
NOTE: THE PROCEDURE SORT USED 0.30 SECONDS AND 1196K.

182          PROC PRINT LABEL;                                                         00001910
183             BY DST;                                                                00001920
184             VAR FCID T17H VOLUME THGHT HVOLUME T17ZD T17CC1-T17CC8 T17G T17D      00001930
185                  T17J;                                                             00001940
186                BY DST;                                                             00001950
```

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6        SAS(R) LOG   OS SAS 5.08          MVS/XA JOB SIX91    STEP A0856C   PROC SAS                    14:18 TUESDAY, JULY 29, 1986
                                                                              00001960
187               TITLE5 '** SORT BY T17W **';                                00001970
188               TITLE6;                                                     00001980
189
NOTE: THE PROCEDURE PRINT USED 0.10 SECONDS AND 736K AND PRINTED PAGES 36 TO 37.
                                                                              00001990
190          PROC UNIVARIATE; VAR VOLUME; WEIGHT THGHT; BY DST T17W;          00002000
191
NOTE: THE PROCEDURE UNIVARIATE USED 0.12 SECONDS AND 744K AND PRINTED PAGES 38 TO 58.
                                                                              00002010
192          PROC SORT DATA = X6; BY T17ZD DESCENDING WVOLUME;

NOTE: DATA SET WORK.X6 HAS 3 OBSERVATIONS AND 26 VARIABLES. 268 OBS/TRK.
NOTE: THE PROCEDURE SORT USED 0.28 SECONDS AND 1196K.
                                                                              00002020
193          PROC PRINT LABEL;                                                00002030
194             VAR FCID T17W VOLUME THGHT WVOLUME T17ZD T17CC1-T17CC8 T17G T17D     00002040
195                 T17J;                                                     00002050
196                 TITLE5 'T17D=4 OR T17D=8 OR T17D=9 OR T17D=12 OR T17D=15 OR T17D=00002060
197          16 OR T17D=17';                                                  00002070
198             TITLE6 '** SORT BY T17ZD **';
NOTE: THE PROCEDURE PRINT USED 0.07 SECONDS AND 736K AND PRINTED PAGE 59.
                                                                              00002080
199          PROC UNIVARIATE; VAR VOLUME; WEIGHT THGHT; BY CATEGORY;
NOTE: THE PROCEDURE UNIVARIATE USED 0.07 SECONDS AND 744K AND PRINTED PAGES 60 TO 61.
                                                                              00002090
200          PROC SORT DATA = X6; BY T17W DESCENDING WVOLUME;

NOTE: DATA SET WORK.X6 HAS 3 OBSERVATIONS AND 26 VARIABLES. 268 OBS/TRK.
NOTE: THE PROCEDURE SORT USED 0.28 SECONDS AND 1196K.
                                                                              00002100
201          PROC PRINT LABEL;                                                00002110
202             VAR FCID T17W VOLUME THGHT WVOLUME T17ZD T17CC1-T17CC8 T17G T17D     00002120
203                 T17J;                                                     00002130
204                 TITLE5 'T17D=4 OR T17D=8 OR T17D=9 OR T17D=12 OR T17D=15 OR T17D=00002140
205          16 OR T17D=17';                                                  00002150
206             TITLE6 '** SORT BY T17W **';
NOTE: THE PROCEDURE PRINT USED 0.06 SECONDS AND 736K AND PRINTED PAGE 62.
                                                                              00002160
207          PROC UNIVARIATE; VAR VOLUME; WEIGHT THGHT; BY T17W;
NOTE: THE PROCEDURE UNIVARIATE USED 0.07 SECONDS AND 744K AND PRINTED PAGES 63 TO 64.

NOTE: SAS INSTITUTE INC.
      SAS CIRCLE
      PO BOX 8000
      CARY, N.C.  27511-8000
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                                              SAS                                          14:18 TUESDAY, JULY 29, 1986   1
                                PREPARED BY DPRA, REQUEST NUMBER  A0856C
                          DATA SOURCE: RIA MAIL SURVEY TSD GENERAL VERSION 3
                                          SOLVENT CATAGORY 1
                                    T17J = 2 OR T17J = 7 OR T17J = 9
                                          ** SORT BY T17ZD **

OBS   FACILITY     WCODE    VOLUME   WEIGHT    WEIGHT  D-FIELD  CC1   CC2   CC3   CC4   CC5   CC6   CC7   CC8   T17G  T17D  T17J
      ID                                       VOLUME

-> 1  MID048090633  F005   4843903  1.9203   9301747   400                                                     .     .     2   Changed to organic liquid
-> 2  MID048090633  F002   2885610  1.9203   5541237   400                                                     .     .     2     "     "    "      "
   3  PRD090028101  X042    171951  1.6020    275466   100    D003  F005                                       .     2     2   Mixed waste now included
   4  NJD002385730  X067  13523660  1.1249  15212765   202    F002  F003  F005  F006  F007  K050  K051  K052   .     .     2     "     "    "     "
   5  CAD041835695  F003     53659  1.9203    103041   206                                                     .     .     2
   6  XXX999999111  F001      6585  1.1787      7762   400                                                     .     .     2
   7  CAD000060012  X113   3892683  1.2104   4711704   401    F001  F005                                       .     .     2
   8  MID000810408  X002    791077  1.8368   1453050   401    249X  F003  F005                                 .     .     2
   9  AID000622464  F003   1092927  1.2258   1339710   401                                                     .     .     2
  10  ALD000622464  F005    757005  1.2258    928917   401                                                     .     .     7   Double-counted
  11  XXX999999003  F001    375610  2.1032    789983   401                                                     .     .     2
  12  XXX999999128  F003    103007  4.0000    412028   401                                                     .     .     2
  13  XXX999999047  F003    154634  1.7896    276733   401                                                     .     .     2
  14  XXX999999128  F002     41088  4.0000    164352   401                                                     .     .     2
  15  XXX999999047  F002     27805  1.7896     49760   401                                                     .     .     2
  16  XXX999999047  F005     15122  1.7896     27062   401                                                     .     .     2
  17  XXX999999048  F001      4390  1.8377      8068   401    001X                                             .     .     2
  18  XXX999999031  F002      2195  1.1224      2464   401                                                     3     .     2
  19  XXX999999031  F005      1951  1.1224      2190   401                                                     3     .     2
  20  NH0890010515  F001       195  1.5181       296   401                                                     .     .     2
  21  COT090011529  F003        42  1.2146        51   401                                                     4     .     2
  22  ALD000622464  F001    670488  1.2258    821884   400    F017                                             2     .     7   Double-counted
  23  IND050530872  M010   1663659  1.5512   2580660   500    F002  F003  F005                                 2     .     2     "        "
  24  MID000810408  X021   1094825  1.8368   2010975   500    F003  F006  F008  F009  F010  F017  K063  U239   .     .     2   Mixed waste now included
  25  TXD000838896  F001   1362826  1.1442   1559346   500    078X                                             .     .     2
  26  MID000810408  X022    448351  1.8368    823531   500    F001  F003  F004  F005  F006  F007  F008  F009   .     .     2   Mixed waste now included
  27  ORD009036716  F005      2927  2.0128      5891   500    U161                                             .     .     2
  28  IND050530872  F005    390488  1.5512    605725   502                                                     .     .     2
  29  KSD070902952  X002     44275  1.1348     50243   505    F003  F005
```

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                                                                 SAS                                14:18 TUESDAY, JULY 29, 1986    2
                                               PREPARED BY OPRA, REQUEST NUMBER  A0856C
                                         DATA SOURCE: RIA MAIL SURVEY TSD GENERAL VERSION 3
                                                          SOLVENT CATAGORY 1
                                                   T17J = 2 OR T17J = 7 OR T17J = 9
                                                         ** SORT BY T17ZD **

                                                         CATEGORY=D-FIELD = 0

                                                              UNIVARIATE

VARIABLE=VOLUME
WEIGHT  =TWGHT          WEIGHT

                 MOMENTS                                            QUANTILES(DEF=4)                                  EXTREMES

N                  2  SUM WGTS      3.8406               100% MAX     4843903    99%      4843903                   LOWEST    HIGHEST
MEAN         3864756  SUM         14842984                 75% Q3     4843903    95%      4843903                  2885610          .
STD DEV      1918877  VARIANCE   3.682E+12                50% MED     3864757    90%      4843903                  4843903          .
SKEWNESS           .  KURTOSIS           .                 25% Q1     2885610    10%      2885610                        .          .
USS        6.105E+13  CSS        3.682E+12                 0% MIN     2885610     5%      2885610                        .    2885610
CV           49.6507  STD MEAN     1356851                                        1%      2885610                        .    4843903
T:MEAN=0     2.84833  PROB>|T|    0.214948                RANGE       1958293
SGN RANK         1.5  PROB>|S|    0.371093                Q3-Q1       1958293
NUM ^= 0           2                                      MODE        2885610
```

```
                                              SAS                              14:18 TUESDAY, JULY 29, 1986    3
                                PREPARED BY DPRA, REQUEST NUMBER  A0856C
                             DATA SOURCE: RIA MAIL SURVEY TSD GENERAL VERSION 3
                                          SOLVENT CATAGORY 1
                                     T17J = 2 OR T17J = 7 OR T17J = 9
                                          ** SORT BY T17ZD **

                                     CATEGORY=D-FIELD = 100 TO 199

                                              UNIVARIATE

VARIABLE=VOLUME
WEIGHT   =TWGHT          WEIGHT

                MOMENTS                                      QUANTILES(DEF=4)                       EXTREMES

N                  1  SUM WGTS       1.602       100% MAX     171951      99%      171951        LOWEST    HIGHEST
MEAN          171951  SUM           275466        75% Q3      171951      95%      171951        171951          .
STD DEV            .  VARIANCE           .        50% MED     171951      90%      171951             .          .
SKEWNESS           .  KURTOSIS           .        25% Q1      171951      10%      171951             .          .
USS       4.737E+10  CSS                 0         0% MIN     171951       5%      171951             .          .
CV                 .  STD MEAN           .                                1%      171951             .     171951
T:MEAN=0           .  PROB>|T|           .       RANGE             0
SGN RANK         0.5  PROB>|S|           1       Q3-Q1             0
NUM ^= 0           1                             MODE         171951
```

```
                                                 SAS                                   14:18 TUESDAY, JULY 29, 1986    4
                                 PREPARED BY DPRA, REQUEST NUMBER  A0856C
                              DATA SOURCE: RIA MAIL SURVEY TSD GENERAL VERSION 3
                                         SOLVENT CATAGORY 1
                                   T17J = 2 OR T17J = 7 OR T17J = 9
                                         ** SORT BY T17ZD **

                                 CATEGORY=D-FIELD = 200 TO 299

                                             UNIVARIATE

VARIABLE=VOLUME
WEIGHT   =TWGHT          WEIGHT

                  MOMENTS                                      QUANTILES(DEF=4)                              EXTREMES

                                                                                                        LOWEST    HIGHEST
N                 2  SUM WGTS      3.0452      100% MAX   13523660      99%    13523660              53659          .
MEAN        5029491  SUM         15315807       75% Q3    13523660      95%    13523660           13523660          .
STD DEV    11344914  VARIANCE   1.287E+14       50% MED    6788660      90%    13523660                  .          .
SKEWNESS          .  KURTOSIS           .       25% Q1       53659      10%       53659                  .      53659
USS       2.057E+14  CSS        1.287E+14        0% MIN      53659       5%       53659                  .   13523660
CV          225.568  STD MEAN     8022066                                1%       53659
T:MEAN=0   0.626957  PROB>|T|    0.643489       RANGE     13470001
SGN RANK        1.5  PROB>|S|    0.371093       Q3-Q1     13470001
NUM ^= 0          2                             MODE         53659
```

```
                                          SAS                                14:18 TUESDAY, JULY 29, 1986    5
                            PREPARED BY DPRA, REQUEST NUMBER  A0856C
                         DATA SOURCE: RIA MAIL SURVEY TSD GENERAL VERSION 3
                                      SOLVENT CATAGORY 1
                                 T17J = 2 OR T17J = 7 OR T17J = 9
                                       ** SORT BY T17ZD **

                                  CATEGORY=D-FIELD = 400 TO 499

                                           UNIVARIATE

VARIABLE=VOLUME
WEIGHT   =TWGHT         WEIGHT

               MOMENTS                                       QUANTILES(DEF=4)                          EXTREMES

N                   17  SUM WGTS      30.1905        100% MAX    3892683     99%      3892683         LOWEST   HIGHEST
MEAN            364221  SUM          10996013         75% Q3      714147     95%      3892683             42    670488
STD DEV        1078062  VARIANCE    1.162E+12         50% MED      41088     90%      1652870            195    757805
SKEWNESS             .  KURTOSIS            .         25% Q1      3292.5     10%        164.4           1951    791077
USS          2.260E+13  CSS         1.860E+13          0% MIN         42      5%           42           2195   1092927
CV             295.991  STD MEAN       261468                                 1%           42           4390   3892683
T:MEAN=0       1.39298  PROB>|T|     0.182679        RANGE       3892641
SGN RANK          76.5  PROB>|S|  .000321048         Q3-Q1        710854
NUM ^= 0            17                               MODE             42
```

```
                                  SAS                                     14:18 TUESDAY, JULY 29, 1986    6
                 PREPARED BY DPRA, REQUEST NUMBER  A0856C
             DATA SOURCE: RIA MAIL SURVEY TSD GENERAL VERSION 3
                          SOLVENT CATAGORY 1
                    T17J = 2 OR T17J = 7 OR T17J = 9
                          ** SORT BY T17ZD **

                     CATEGORY=D-FIELD = 500 TO 599

                              UNIVARIATE

VARIABLE=VOLUME
WEIGHT   =TWGHT            WEIGHT

                 MOMENTS                                      QUANTILES(DEF=4)                             EXTREMES

N                   7  SUM WGTS     11.0678          100% MAX    1663659      99%     1663659          LOWEST    HIGHEST
MEAN           689964  SUM          7636379           75% Q3     1362826      95%     1663659            2927     390488
STD DEV        812333  VARIANCE   6.599E+11           50% MED     448351      90%     1663659           44275     448351
SKEWNESS            .  KURTOSIS           .           25% Q1       44275      10%        2927          390488    1094825
USS         9.228E+12  CSS        3.959E+12            0% MIN       2927       5%        2927          448351    1362826
CV            117.736  STD MEAN      307033                                    1%        2927         1094825    1663659
T:MEAN=0       2.2472  PROB>|T|   0.0656939          RANGE       1660732
SGN RANK           14  PROB>|S|   0.0224943          Q3-Q1       1318551
NUM ¬= 0            7                                MODE           2927
```

```
                                         SAS                               14:18 TUESDAY, JULY 29, 1986     7
                          PREPARED BY OPRA, REQUEST NUMBER  A0856C
                        DATA SOURCE: RIA MAIL SURVEY TSD GENERAL VERSION 3
                                     SOLVENT CATAGORY 1
                                T17J = 2 OR T17J = 7 OR T17J = 10
                                      ** SORT BY T17H **

 OBS   FACILITY     HCODE    VOLUME   WEIGHT    WEIGHT   D-FIELD  CCI   CC2   CC3   CC4   CC5   CC6   CC7   CC8   T176  T17D  T17J
        ID                                      VOLUME

   1  TXD000838896  F001    1362826  1.1442   1559346    500    078X                                               .     .     2
~~ 2  ALD000622464  F001     670400  1.2250    821884    400    F017                                               2     .     7~~  Double-counted
   3  XXX999999003  F001     375610  2.1032    789983    401                                                       .     .     2
   4  XXX999999111  F001       6585  1.1787      7762    400                                                       .     .     2
   5  XXX999999048  F001       4390  1.8377      8068    401    001X                                               .     .     2
   6  NM0890010515  F001        195  1.5181       296    401                                                       .     .     2
→  7  MID048090633  F002    2885610  1.9203   5541237     400                                                      .     .     2    Changed to organic liquid
   8  XXX999999128  F002      41088  4.0000    164352    401                                                       .     .     2
   9  XXX999999047  F002      27805  1.7896     49760    401                                                       .     .     2
  10  XXX999999031  F002       2195  1.1224      2464    401                                                       3     .     2
  11  ALD000622464  F003    1092927  1.2258   1339710    401                                                       .     .     2
  12  XXX999999047  F003     154634  1.7896    276733    401                                                       .     .     2
  13  XXX999999128  F003     103007  4.0000    412028    401                                                       .     .     2
  14  CAD041835695  F003      53659  1.9203    103041    206                                                       .     .     2
  15  COT090011529  F003         42  1.2146        51    401                                                       4     .     2
→ 16  MID048090633  F005    4843903  1.9203   9301747     400                                                      .     .     2    Changed to organic liquid
~~17  ALD000622464  F005     757005  1.2250    928917    401                                                       .     .     7~~  Double-counted
  18  IND050530872  F005     390488  1.5512    605725    502                                                       .     .     2
  19  XXX999999047  F005      15122  1.7896     27062    401                                                       .     .     2
  20  ORD009036716  F005       2927  2.0128      5891    500    U161                                               .     .     2
  21  XXX999999031  F005       1951  1.1224      2190    401                                                       3     .     2
  22  MID000810408  X002     791077  1.8368   1453050    401    249X  F003  F005                                   .     .     2
  23  KSD070902952  X002      44275  1.1348     50243    505    F003  F005                                         .     .     2
~~24  IND050530872  X018    1663659  1.5512   2580660    500    F002  F003  F005                                   2     .     2~~  Double-counted
  25  MID000810408  X021    1094825  1.8368   2010975    500    F003  F006  F008  F009  F010  F017  K063  U239     .     .     2  }
  26  MID000810408  X022     448351  1.8368    823531    500    F001  F003  F004  F005  F006  F007  F008  F009     .     .     2  } Mixed wastes now included
  27  PRD090028101  X042     171951  1.6020    275466    100    D003  F005                                         .     2     2  }
  28  NJD002385730  X067   13923660  1.1249  15212765    202    F002  F003  F005  F006  F007  K050  K051  K052     .     .     2  }
  29  CAD000060012  X113    3892683  1.2104   4711704    401    F001  F005                                         .     .     2
```

```
                                      SAS                                14:18 TUESDAY, JULY 29, 1986    8
                     PREPARED BY DPRA, REQUEST NUMBER  A0856C
                  DATA SOURCE: RIA MAIL SURVEY TSD GENERAL VERSION 3
                                SOLVENT CATAGORY 1
                         T17J = 2 OR T17J = 7 OR T17J = 10
                                ** SORT BY T17H **

                                   WCODE=F001

                                   UNIVARIATE

VARIABLE=VOLUME
WEIGHT   =TWGHT         WEIGHT

              MOMENTS                                         QUANTILES(DEF=4)                                    EXTREMES

N                 6  SUM WGTS       9.0077          100% MAX    1362826       99%      1362826           LOWEST    HIGHEST
MEAN         353846  SUM           3187338           75% Q3      843573       95%      1362826              195       4390
STD DEV      607481  VARIANCE    3.690E+11           50% MED     191098       90%      1362826             4390       6585
SKEWNESS          .  KURTOSIS            .           25% Q1     3341.25       10%          195             6585     375610
USS       2.973E+12  CSS         1.845E+12            0% MIN        195        5%          195           375610     670488
CV           171.68  STD MEAN       248003                                     1%          195           670488    1362826
T:MEAN=0    1.42678  PROB>|T|     0.212987          RANGE       1362631
SGN RANK       10.5  PROB>|S|    0.0360317          Q3-Q1        840231
NUM ^= 0          6                                 MODE            195
```

```
                                             SAS                                     14:18 TUESDAY, JULY 29, 1986    9
                              PREPARED BY DPRA, REQUEST NUMBER  A0856C
                          DATA SOURCE: RIA MAIL SURVEY TSD GENERAL VERSION 3
                                       SOLVENT CATAGORY 1
                                  T17J = 2 OR T17J = 7 OR T17J = 10
                                        ** SORT BY T17M **

                                            WCODE=F002

                                            UNIVARIATE

VARIABLE=VOLUME
WEIGHT  =IWGHT          WEIGHT

               MOMENTS                                      QUANTILES(DEF=4)                        EXTREMES

                                                                                                LOWEST   HIGHEST
N                  4  SUM WGTS     8.8323         100% MAX   2885610     99%     2885610         2195         .
MEAN          651904  SUM         5757812          75% Q3    2174480     95%     2885610        27805      2195
STD DEV      2020268  VARIANCE  4.081E+12          50% MED   34446.5     90%     2885610        41088     27805
SKEWNESS           .  KURTOSIS          .          25% Q1     8597.5     10%        2195      2885610     41088
USS        1.600E+13  CSS       1.224E+13           0% MIN      2195      5%        2195            .   2885610
CV           309.903  STD MEAN    1010134                                 1%        2195
T:MEAN=0    0.645364  PROB>|T|   0.564651          RANGE     2883415
SGN RANK           5  PROB>|S|   0.100348          Q3-Q1     2165882
NUM ^= 0           4                               MODE         2195
```

```
                                          SAS                                    14:18 TUESDAY, JULY 29, 1986   10
                              PREPARED BY DPRA, REQUEST NUMBER  A0856C
                          DATA SOURCE: RIA MAIL SURVEY TSD GENERAL VERSION 3
                                       SOLVENT CATAGORY 1
                                  T17J = 2 OR T17J = 7 OR T17J = 10
                                        ** SORT BY T17W **

                                            WCODE=F003

                                            UNIVARIATE

VARIABLE=VOLUME
WEIGHT   =IWGHT          WEIGHT

               MOMENTS                                     QUANTILES(DEF=4)                             EXTREMES

N                  5  SUM WGTS     10.1503          100% MAX    1092927      99%     1092927       LOWEST   HIGHEST
MEAN          210000  SUM          2131563           75% Q3      623781      95%     1092927           42        42
STD DEV       526151  VARIANCE   2.768E+11           50% MED     103007      90%     1092927        53659     53659
SKEWNESS           .  KURTOSIS           .           25% Q1     26850.5      10%          42       103007    103007
USS        1.555E+12  CSS        1.107E+12            0% MIN         42       5%          42       154634    154634
CV           250.548  STD MEAN      235302                                    1%          42      1092927   1092927
T:MEAN=0     0.89247  PROB>|T|    0.422579          RANGE       1092885
SGN RANK         7.5  PROB>|S|   0.0590582          Q3-Q1        596930
NUM ¬= 0           5                                MODE             42
```

```
                                                   SAS                                 14:18 TUESDAY, JULY 29, 1986   11
                                    PREPARED BY DPRA, REQUEST NUMBER  A0856C
                                DATA SOURCE: RIA MAIL SURVEY TSD GENERAL VERSION 3
                                             SOLVENT CATAGORY 1
                                       T17J = 2 OR T17J = 7 OR T17J = 10
                                              ** SORT BY T17H **

                                                 WCODE=F005

                                                 UNIVARIATE

VARIABLE=VOLUME
WEIGHT  =TWGHT          WEIGHT

                                                            QUANTILES(DEF=4)                            EXTREMES
              MOMENTS
                                                                                                LOWEST    HIGHEST
N                  6  SUM WGTS        9.6221        100% MAX     4843903     99%     4843903      1951       2927
MEAN         1129850  SUM           10871533         75% Q3      1779330     95%     4843903      2927      15122
STD DEV      2596708  VARIANCE     6.743E+12         50% MED      202805     90%     4843903     15122     390488
SKEWNESS           .  KURTOSIS             .         25% Q1         2683     10%        1951    390488     757805
USS        4.600E+13  CSS          3.371E+13          0% MIN        1951      5%        1951    757805    4843903
CV           229.828  STD MEAN       1060101                                  1%        1951
T:MEAN=0     1.06579  PROB>|T|      0.335253        RANGE        4841952
SGN RANK        10.5  PROB>|S|     0.0360317        Q3-Q1        1776647
NUM ^= 0           6                                MODE            1951
```

```
                                                  SAS                                 14:18 TUESDAY, JULY 29, 1986   12
                                PREPARED BY OPRA, REQUEST NUMBER  A0856C
                            DATA SOURCE: RIA MAIL SURVEY TSD GENERAL VERSION 3
                                          SOLVENT CATAGORY 1
                                   T17J = 2 OR T17J = 7 OR T17J = 10
                                          ** SORT BY T17H **

                                              WCODE=X002

                                              UNIVARIATE

VARIABLE=VOLUME
WEIGHT  =IWGHT          WEIGHT

                                                   QUANTILES(DEF=4)                               EXTREMES
              MOMENTS
                                             100% MAX     791077     99%      791077          LOWEST    HIGHEST
N                   2  SUM WGTS     2.9716    75% Q3      791077     95%      791077           44275          .
MEAN           505887  SUM         1503294    50% MED     417676     90%      791077          791077          .
STD DEV        625462  VARIANCE  3.912E+11    25% Q1       44275     10%       44275               .          .
SKEWNESS            .  KURTOSIS          .     0% MIN      44275      5%       44275               .      44275
USS         1.152E+12  CSS       3.912E+11                            1%       44275               .     791077
CV            123.637  STD MEAN     442268     RANGE      746802
T:MEAN=0      1.14385  PROB>|T|   0.457349     Q3-Q1      746802
SGN RANK          1.5  PROB>|S|   0.371093     MODE        44275
NUM ^= 0            2
```

```
                                                   SAS                              14:18 TUESDAY, JULY 29, 1986   13
                                 PREPARED BY DPRA, REQUEST NUMBER  A0856C
                              DATA SOURCE: RIA MAIL SURVEY TSD GENERAL VERSION 3
                                           SOLVENT CATAGORY 1
                                     T17J = 2 OR T17J = 7 OR T17J = 10
                                           ** SORT BY T17W **

                                              WCODE=X018

                                              UNIVARIATE

VARIABLE=VOLUME
WEIGHT  =TWGHT          WEIGHT

                 MOMENTS                                         QUANTILES(DEF=4)                          EXTREMES

N                1  SUM WGTS     1.5512           100% MAX   1663659      99%     1663659             LOWEST    HIGHEST
MEAN       1663659  SUM         2580668            75% Q3    1663659      95%     1663659            1663659          .
STD DEV          .  VARIANCE          .            50% MED   1663659      90%     1663659                  .          .
SKEWNESS         .  KURTOSIS          .            25% Q1    1663659      10%     1663659                  .          .
USS      4.293E+12  CSS               0             0% MIN   1663659       5%     1663659                  .          .
CV               .  STD MEAN          .                                    1%     1663659                  .    1663659
T:MEAN=0         .  PRCB>|T|          .           RANGE            0
SGN RANK       0.5  PROB>|S|          1           Q3-Q1            0
NUM ¬= 0         1                                MODE       1663659
```

```
                                                      SAS                              14:18 TUESDAY, JULY 29, 1986   14
                                     PREPARED BY DPRA, REQUEST NUMBER  A0856C
                                  DATA SOURCE: RIA MAIL SURVEY TSD GENERAL VERSION 3
                                                SOLVENT CATAGORY 1
                                        T17J = 2 OR T17J = 7 OR T17J = 10
                                               ** SORT BY T17W **

                                                   WCODE=X021

                                                   UNIVARIATE

VARIABLE=VOLUME
WEIGHT   =TWGHT          WEIGHT

                                                                 QUANTILES(DEF=4)                                EXTREMES
                  MOMENTS
                                                                                                            LOWEST    HIGHEST
N                  1  SUM WGTS      1.8368          100% MAX    1094825      99%      1094825              1094825          .
MEAN         1094825  SUM          2010975           75% Q3     1094825      95%      1094825                    .          .
STD DEV            .  VARIANCE           .           50% MED    1094825      90%      1094825                    .          .
SKEWNESS           .  KURTOSIS           .           25% Q1     1094825      10%      1094825                    .          .
USS        2.202E+12  CSS                0            0% MIN    1094825       5%      1094825                    .    1094825
CV                 .  STD MEAN           .                                    1%      1094825
T:MEAN=0           .  PROB>|T|           .          RANGE             0
SGN RANK         0.5  PROB>|S|           1          Q3-Q1             0
NUM ^= 0           1                                MODE        1094825
```

```
                                         SAS                             14:18 TUESDAY, JULY 29, 1986   16
                          PREPARED BY OPRA, REQUEST NUMBER  A0856C
                     DATA SOURCE: RIA MAIL SURVEY TSD GENERAL VERSION 3
                                   SOLVENT CATAGORY 1
                             T17J = 2 OR T17J = 7 OR T17J = 10
                                   ** SORT BY T17H **

                                      WCODE=X042

                                      UNIVARIATE

VARIABLE=VOLUME
WEIGHT  =TWGHT          WEIGHT

               MOMENTS                                 QUANTILES(DEF=4)                           EXTREMES

N                    1  SUM WGTS       1.602     100% MAX    171951      99%      171951       LOWEST    HIGHEST
MEAN            171951  SUM           275466      75% Q3     171951      95%      171951       171951          .
STD DEV              .  VARIANCE           .      50% MED    171951      90%      171951            .          .
SKEWNESS             .  KURTOSIS           .      25% Q1     171951      10%      171951            .          .
USS          4.737E+10  CSS                0       0% MIN    171951       5%      171951            .          .
CV                   .  STD MEAN           .                               1%      171951            .     171951
T:MEAN=0             .  PROB>|T|           .     RANGE            0
SGN RANK           0.5  PROB>|S|           1     Q3-Q1            0
NUM ¬= 0             1                           MODE        171951
```

```
                                             SAS                          14:18 TUESDAY, JULY 29, 1986   15
                              PREPARED BY DPRA, REQUEST NUMBER  A0856C
                           DATA SOURCE: RIA MAIL SURVEY TSD GENERAL VERSION 3
                                        SOLVENT CATAGORY 1
                                  T17J = 2 OR T17J = 7 OR T17J = 10
                                         ** SORT BY T17H **

                                           WCODE=X022

                                           UNIVARIATE

VARIABLE=VOLUME
WEIGHT   =IWGHT          WEIGHT

                                                         QUANTILES(DEF=4)                         EXTREMES
                 MOMENTS
                                                                                               LOWEST   HIGHEST
N                 1  SUM WGTS    1.8368       100% MAX    448351     99%      448351           448351        .
MEAN         448351  SUM         823531        75% Q3     448351     95%      448351                .        .
STD DEV           .  VARIANCE         .        50% MED    448351     90%      448351                .        .
SKEWNESS          .  KURTOSIS         .        25% Q1     448351     10%      448351                .        .
USS      3.692E+11   CSS              0         0% MIN    448351      5%      448351                .   448351
CV                .  STD MEAN         .                               1%      448351
T:MEAN=0          .  PROB>|T|         .       RANGE            0
SGN RANK        0.5  PROB>|S|         1       Q3-Q1            0
NUM ^= 0          1                           MODE        448351
```

```
                                                   SAS                              14:18 TUESDAY, JULY 29, 1986   21
                                  PREPARED BY DPRA, REQUEST NUMBER  A0856C
                                DATA SOURCE: RIA MAIL SURVEY TSD GENERAL VERSION 3
                                            SOLVENT CATAGORY 1
                                           ** SORT BY T172D **

                          DST=SURFACE IMPOUNDMENT TREATMENT ONLY CATEGORY=D-FIELD = 300 TO 399

                                                UNIVARIATE

VARIABLE=VOLUME
WEIGHT  =IWGHT          WEIGHT

                  MOMENTS                                  QUANTILES(DEF=4)                          EXTREMES

N                     1  SUM WGTS      1.1522      100% MAX  160487823     99%   160487808        LOWEST    HIGHEST
MEAN          160487823  SUM        184914070       75% Q3   160487808     95%   160487808     160487823          .
STD DEV               .  VARIANCE           .       50% MED  160487808     90%   160487808             .          .
SKEWNESS              .  KURTOSIS           .       25% Q1   160487808     10%   160487808             .          .
USS          2.968E+16   CSS                0        0% MIN  160487823      5%   160487808             .  160487823
CV                    .  STD MEAN           .                               1%   160487808
T:MEAN=0              .  PROB>|T|           .      RANGE             0
SGN RANK            0.5  PROB>|S|           1      Q3-Q1             0
NUM ^= 0              1                            MODE      160487808
```

```
                                        SAS                                   14:18 TUESDAY, JULY 29, 1986   20
                        PREPARED BY OPRA, REQUEST NUMBER  A0856C
                   DATA SOURCE: RIA MAIL SURVEY TSD GENERAL VERSION 3
                                  SOLVENT CATAGORY 1
                                  ** SORT BY T17ZD **

----------------------------------------------DST=TREATMENT AND STORAGE IN SI-----------------------------------------------

  OBS    FACILITY      HCODE     VOLUME   WEIGHT    WEIGHT  D-FIELD  CC1    CC2    CC3  CC4  CC5  CC6  CC7  CC8  T17G  T17D  T17J
          ID                                        VOLUME

   36   TX6213820529   F003        1180   1.4225      1679    400    U002                                          7     3     .
   37   TX6213820529   F005         950   1.4225      1351    400    U159                                          2     3     .
   38   PAD082434747   F001        3100   2.3723      7354    401    X995                                          2     3     .
   39   OHD020273819   F001      418091   1.1645    486867    500    001X                                          2     3     1
   40   OHD020273819   F002     3001668   1.1645   3495442    502    005X                                          2     3     1
   41   OHD020273819   F003      179719   1.1645    209283    502                                                  2     3     1
   42   MID002931228   F005       15122   2.2241     33633    502    U220   U159                                   2    11     .

------------------------------------------DST=SURFACE IMPOUNDMENT DISPOSAL ONLY---------------------------------------------

  OBS    FACILITY      HCODE     VOLUME   WEIGHT    WEIGHT  D-FIELD  CC1    CC2    CC3  CC4  CC5  CC6  CC7  CC8  T17G  T17D  T17J
          ID                                        VOLUME

   43   NCD001810365   F002     4303659   1.1744   5054217    201    004X                                          .     .     3
   44   NCD001810365   F002      126585   1.1744    148661    202    034X                                          .     .     3
   45   NCD001810365   F002      801220   1.1744    940953    203    006X                                          .     .     3
   46   TXD980626774   F003      645854   1.3693    884368    400    U154   047X                                   .     .     3
   47   ALD000622464   F005      757805   1.2258    928917    401                                                  .     .     7
   48   TXD007377278   F001           1   1.3128         1    401    U211                                          .     .     3

----------------------------------------------DST=TREATMENT AND DISPOSAL IN SI----------------------------------------------

  OBS    FACILITY      HCODE     VOLUME   WEIGHT    WEIGHT  D-FIELD  CC1    CC2    CC3  CC4  CC5  CC6  CC7  CC8  T17G  T17D  T17J
          ID                                        VOLUME

   49   ALD000622464   F001      670488   1.2258    821884    408    F017                                          2     .     7
```

```
                                           SAS                                14:18 TUESDAY, JULY 29, 1986   23
                            PREPARED BY DPRA, REQUEST NUMBER  A0856C
                         DATA SOURCE: RIA MAIL SURVEY TSD GENERAL VERSION 3
                                    SOLVENT CATAGORY 1
                                    ** SORT BY T172D **

                   DST=SURFACE IMPOUNDMENT TREATMENT ONLY CATEGORY=D-FIELD = 500 TO 599

                                        UNIVARIATE

VARIABLE=VOLUME
WEIGHT  =TWGHT          WEIGHT

                                                  QUANTILES(DEF=4)                           EXTREMES
                 MOMENTS
                                                                                       LOWEST    HIGHEST
N                   3  SUM WGTS      6.9496     100% MAX    1663659    99%    1663659    10244          .
MEAN           381572  SUM          2651770      75% Q3     1663659    95%    1663659    16098          .
STD DEV       1281112  VARIANCE   1.641E+12      50% MED      16098    90%    1663659  1663659      10244
SKEWNESS            .  KURTOSIS           .      25% Q1       10244    10%      10244        .      16098
USS         4.294E+12  CSS        3.282E+12       0% MIN      10244     5%      10244        .    1663659
CV            335.746  STD MEAN      739650                              1%      10244
T:MEAN=0     0.515881  PROB>|T|    0.657306      RANGE      1653415
SGN RANK            3  PROB>|S|    0.181449      Q3-Q1      1653415
NUM ¬= 0            3                            MODE         10244

                                                 MISSING VALUE       A
                                                         COUNT       1
                                                  % COUNT/NOBS   25.00
```

```
                                              SAS                          14:18 TUESDAY, JULY 29, 1986   22
                             PREPARED BY DPRA, REQUEST NUMBER  A0856C
                          DATA SOURCE: RIA MAIL SURVEY TSD GENERAL VERSION 3
                                        SOLVENT CATASCRY 1
                                       ** SORT BY T17ZD **

                   DST=SURFACE IMPOUNDMENT TREATMENT ONLY CATEGORY=D-FIELD = 400 TO 499

                                            UNIVARIATE

VARIABLE=VOLUME
WEIGHT   =IWGHT          WEIGHT
                                                                                            EXTREMES
                                                 QUANTILES(DEF=4)
             MOMENTS                                                                    LOWEST    HIGHEST
                                           100% MAX  148853634       99%   148853632     20122      20122
N                 5  SUM WGTS      6.8168   75% Q3    83781816       95%   148853632     65000      65000
MEAN       29505457  SUM        201132798   50% MED     100488       90%   148853632    100488     100488
STD DEV    71214706  VARIANCE   5.072E+15   25% Q1       42561       10%       20122  18710002   18710002
SKEWNESS          .  KURTOSIS           .    0% MIN      20122        5%       20122 148853634  148853634
USS       2.622E+16  CSS        2.029E+16                             1%       20122
CV          241.361  STD MEAN    31848185   RANGE    148833512
T:MEAN=0   0.926441  PROB>|T|    0.406654   Q3-Q1     83739255
SGN RANK        7.5  PROB>|S|   0.0590582   MODE         20122
NUM ^= 0          5
```

```
                                                        SAS                                   14:18 TUESDAY, JULY 29, 1986   25
                                     PREPARED BY OPPA, REQUEST NUMBER  A0856C
                                 DATA SOURCE: RIA MAIL SURVEY TSD GENERAL VERSION 3
                                              SOLVENT CATAGORY 1
                                               ** SORT BY T17ZD **

                          DST=SURFACE IMPOUNDMENT STORAGE ONLY CATEGORY=D-FIELD = 200 TO 299

                                                   UNIVARIATE

VARIABLE=VOLUME
WEIGHT  =TWGHT          WEIGHT

                 MOMENTS                                      QUANTILES(DEF=4)                              EXTREMES

                                                                                                         LOWEST   HIGHEST
N                  1  SUM WGTS      2.1074          100% MAX    5902440     99%     5902440              5902440         .
MEAN         5902440  SUM         12438802           75% Q3     5902440     95%     5902440                    .         .
STD DEV            .  VARIANCE           .           50% MED    5902440     90%     5902440                    .         .
SKEWNESS           .  KURTOSIS           .           25% Q1     5902440     10%     5902440                    .         .
USS        7.342E+13  CSS                0            0% MIN    5902440      5%     5902440                    .   5902440
CV                 .  STD MEAN           .                                   1%     5902440
T:MEAN=0           .  PROB>|T|           .          RANGE             0
SGN RANK         0.5  PROB>|S|           1          Q3-Q1             0
NUM ~= 0           1                                MODE        5902440
```

```
                                                     SAS                                   14:18 TUESDAY, JULY 29, 1986   24
                                      PREPARED BY DPRA, REQUEST NUMBER  A0856C
                                  DATA SOURCE: RIA MAIL SURVEY TSD GENERAL VERSION 3
                                                SOLVENT CATAGORY 1
                                                ** SORT BY T17ZD **

                                DST=SURFACE IMPOUNDMENT STORAGE ONLY CATEGORY=D-FIELD = 0

                                                    UNIVARIATE

VARIABLE=VOLUME
WEIGHT   =IWGHT          WEIGHT

                 MOMENTS                                          QUANTILES(DEF=4)                                 EXTREMES

                                                                                                                LOWEST    HIGHEST
N                   1  SUM WGTS        1.494      100% MAX      900000      99%        900000                   900000          .
MEAN           900000  SUM           1344600       75% Q3       900000      95%        900000                        .          .
STD DEV             .  VARIANCE            .       50% MED      900000      90%        900000                        .          .
SKEWNESS            .  KURTOSIS            .       25% Q1       900000      10%        900000                        .          .
USS         1.210E+12  CSS                 0        0% MIN      900000       5%        900000                        .     900000
CV                  .  STD MEAN            .                                 1%        900000
T:MEAN=0            .  PROB>|T|            .      RANGE              0
SGN RANK          0.5  PROB>|S|            1      Q3-Q1              0
NUM -= 0            1                             MODE          900000
```

```
                                          SAS                                   14:18 TUESDAY, JULY 29, 1986   27
                              PREPARED BY DPRA, REQUEST NUMBER  A0856C
                          DATA SOURCE: RIA MAIL SURVEY TSD GENERAL VERSION 3
                                        SOLVENT CATAGORY 1
                                        ** SORT BY T17ZD **

                   DST=SURFACE IMPOUNDMENT STORAGE ONLY CATEGORY=D-FIELD = 400 TO 499

                                             UNIVARIATE

VARIABLE=VOLUME
WEIGHT   =TWGHT           WEIGHT
                                                                                            EXTREMES
                                                          QUANTILES(DEF=4)
               MOMENTS                                                                  LOWEST    HIGHEST
                                                100% MAX   35000000     99%   35000000        5          5
N                  5  SUM WGTS       9.2688      75% Q3    17900000     95%   35000000       15         15
MEAN         8520829  SUM          78977859      50% MED     404634     90%   35000000   404634     404634
STD DEV     22555826  VARIANCE    5.088E+14      25% Q1          10     10%          5   800000     800000
SKEWNESS           .  KURTOSIS            .       0% MIN          5      5%          5 35000000   35000000
USS        2.708E+15  CSS         2.035E+15                              1%          5
CV           264.714  STD MEAN     10087272     RANGE      34999995
T:MEAN=0    0.844711  PROB>|T|     0.445835     Q3-Q1      17899990
SGN RANK         7.5  PROB>|S|    0.0590582     MODE              5
NUM ^= 0           5
```

```
                                                    SAS                                      14:18 TUESDAY, JULY 29, 1986   26
                                  PREPARED BY DPRA, REQUEST NUMBER  A0856C
                              DATA SOURCE: RIA MAIL SURVEY TSD GENERAL VERSION 3
                                             SOLVENT CATAGORY 1
                                             ** SORT BY T17ZD **

                    DST=SURFACE IMPOUNDMENT STORAGE ONLY CATEGORY=D-FIELD = 300 TO 399

                                                UNIVARIATE

VARIABLE=VOLUME
WEIGHT  =WGHT           WEIGHT

                                                                                                        EXTREMES
              MOMENTS                                        QUANTILES(DEF=4)
                                                                                                     LOWEST    HIGHEST
N                    2  SUM WGTS      2.4117        100% MAX  153658553     99%    153658544          170842          .
MEAN          71037271  SUM        171320586         75% Q3  153658544     95%    153658544       153658553          .
STD DEV      118830488  VARIANCE   1.412E+16         50% MED  76914693     90%    153658544               .          .
SKEWNESS             .  KURTOSIS           .         25% Q1     170842     10%       170842               .     170842
USS          2.629E+16  CSS        1.412E+16          0% MIN    170842      5%       170842               .  153658553
CV             167.279  STD MEAN    84025844                                1%       170842
T:MEAN=0      0.845422  PROB>|T|    0.553201         RANGE   153487711
SGN RANK           1.5  PROB>|S|    0.371093         Q3-Q1   153487702
NUM ^= 0             2                               MODE       170842

                                                     MISSING VALUE        B
                                                            COUNT         1
                                                      % COUNT/NOBS    33.33
                                  SAS
                 PREPARED BY DPRA, REQUEST NUMBER  A0856C
            DATA SOURCE: RIA MAIL SURVEY TSD GENERAL VERSION 3
                          SOLVENT CATAGORY 1
                          ** SORT BY T17ZD **

          DST=TREATMENT AND STORAGE IN SI CATEGORY=D-FIELD = 0

                               UNIVARIATE

VARIABLE=VOLUME
WEIGHT  =IWGHT           WEIGHT

                        MISSING VALUE       A
                                COUNT       4
                         % COUNT/NOBS  100.00
```

```
                                              SAS                               14:18 TUESDAY, JULY 29, 1986   28
                              PREPARED BY DPRA, REQUEST NUMBER  A0856C
                            DATA SOURCE: RIA MAIL SURVEY TSD GENERAL VERSION 3
                                          SOLVENT CATAGORY 1
                                         ** SORT BY T17ZD **

                        DST=SURFACE IMPOUNDMENT STORAGE ONLY CATEGORY=D-FIELD = 500 TO 599

                                              UNIVARIATE

VARIABLE=VOLUME
WEIGHT  =TWGHT          WEIGHT

              MOMENTS                                            QUANTILES(DEF=4)                          EXTREMES

                                                                                                       LOWEST   HIGHEST
N                   2  SUM WGTS      4.3171        100% MAX   21382929      99%     21382928             8500         .
MEAN         10442465  SUM         45081167         75% Q3    21382928      95%     21382928         21382929         .
STD DEV      22199266  VARIANCE   4.928E+14         50% MED   10695714      90%     21382928                .         .
SKEWNESS            .  KURTOSIS           .         25% Q1        8500      10%         8500                .      8500
USS         9.636E+14  CSS        4.928E+14          0% MIN       8500       5%         8500                .  21382929
CV            212.586  STD MEAN    15697251                                  1%         8500
T:MEAN=0     0.665242  PROB>|T|    0.626294         RANGE     21374429
SGN RANK          1.5  PROB>|S|    0.371093         Q3-Q1     21374428
NUM ¬= 0            2                               MODE          8500
```

```
                                                SAS                              14:18 TUESDAY, JULY 29, 1986   31
                                 PREPARED BY DPRA, REQUEST NUMBER  A0856C
                              DATA SOURCE: RIA MAIL SURVEY TSD GENERAL VERSION 3
                                         SOLVENT CATAGORY 1
                                         ** SORT BY T17ZD **

                         DST=TREATMENT AND STORAGE IN SI CATEGORY=D-FIELD = 400 TO 499

                                             UNIVARIATE

VARIABLE=VOLUME
WEIGHT  =TWGHT          WEIGHT
                                                                                                  EXTREMES
                                                            QUANTILES(DEF=4)
               MOMENTS                                                                         LOWEST   HIGHEST
                                                  100% MAX       43902      99%        43902       950      3100
N                   9  SUM WGTS      16.8637       75% Q3      21397.5      95%        43902      1180      6400
MEAN          11616.3  SUM            195894       50% MED        3100      90%        43902      1185     20600
STD DEV       20535.8  VARIANCE    421718980       25% Q1       1182.5      10%          950      2220     22195
SKEWNESS            .  KURTOSIS            .        0% MIN         950       5%          950      3100     43902
USS        5649308321  CSS        3373751838                                 1%          950
CV            176.785  STD MEAN      6845.27      RANGE          42952
T:MEAN=0      1.69698  PROB>|T|     0.128137      Q3-Q1          20215
SGN RANK         22.5  PROB>|S|   0.00915169      MODE             950
NUM ^= 0            9
```

```
                                              SAS                                     14:18 TUESDAY, JULY 29, 1986   30
                                PREPARED BY DPRA, REQUEST NUMBER  A0856C
                             DATA SOURCE: RIA MAIL SURVEY TSD GENERAL VERSION 3
                                           SOLVENT CATAGORY 1
                                          ** SORT BY T17ZD **

                          DST=TREATMENT AND STORAGE IN SI CATEGORY=D-FIELD = 300 TO 399

                                               UNIVARIATE

VARIABLE=VOLUME
WEIGHT  =TWGHT          WEIGHT

                MOMENTS                                           QUANTILES(DEF=4)                                   EXTREMES

N                     3  SUM WGTS      4.0849        100% MAX 1113682074      99%    1113681920           LOWEST     HIGHEST
MEAN          512202653  SUM       2092296616         75% Q3  1113681920      95%    1113681920          2000000           .
STD DEV       675157909  VARIANCE   4.558E+17         50% MED  341463296      90%    1113681920        341463452           .
SKEWNESS              .  KURTOSIS           .         25% Q1     2000000      10%       2000000       1113682074     2000000
USS           1.983E+18  CSS        9.117E+17          0% MIN    2000000       5%       2000000                .   341463452
CV              131.815  STD MEAN   389802601                                  1%       2000000                .  1113682074
T:MEAN=0        1.31401  PROB>|T|    0.319324         RANGE   1111682074
SGN RANK              3  PROB>|S|    0.181449         Q3-Q1   1111681920
NUM ^= 0              3                               MODE       2000000
```

```
                                          SAS                                 14:18 TUESDAY, JULY 29, 1986   33
                          PREPARED BY DPRA, REQUEST NUMBER  A0856C
                      DATA SOURCE: RIA MAIL SURVEY TSD GENERAL VERSION 3
                                   SOLVENT CATAGORY 1
                                    ** SORT BY T17ZD **

                  DST=SURFACE IMPOUNDMENT DISPOSAL ONLY CATEGORY=D-FIELD = 200 TO 299

                                        UNIVARIATE

VARIABLE=VOLUME
WEIGHT   =TWGHT          WEIGHT

                                                     QUANTILES(DEF=4)                           EXTREMES
               MOMENTS
                                                                                             LOWEST   HIGHEST
                                            100% MAX    4303659     99%     4303659          126585         .
N                3  SUM WGTS      3.5232     75% Q3     4303659     95%     4303659          801220         .
MEAN      1743821'  SUM          6143831     50% MED     801220     90%     4303659         4303659    126585
STD DEV    2430083  VARIANCE   5.905E+12     25% Q1      126585     10%      126585               .    801220
SKEWNESS         .  KURTOSIS           .      0% MIN     126585      5%      126585               .   4303659
USS      2.252E+13  CSS        1.181E+13                              1%      126585
CV         139.354  STD MEAN     1403009    RANGE       4177074
T:MEAN=0   1.24291  PROB>|T|    0.339849    Q3-Q1       4177074
SGN RANK         3  PROB>|S|    0.181449    MODE         126585
NUM ^= 0         3
```

```
                                          SAS                                      14:18 TUESDAY, JULY 29, 1986   35
                            PREPARED BY DPRA, REQUEST NUMBER  A0856C
                         DATA SOURCE: RIA MAIL SURVEY TSD GENERAL VERSION 3
                                     SOLVENT CATAGORY 1
                                     ** SORT BY T17ZD **

                   DST=TREATMENT AND DISPOSAL IN SI CATEGORY=D-FIELD = 400 TO 499

                                         UNIVARIATE

VARIABLE=VOLUME
WEIGHT  =TWGHT          WEIGHT

                                                                                              EXTREMES
                 MOMENTS                                   QUANTILES(DEF=4)
                                                                                          LOWEST   HIGHEST
N                  1  SUM WGTS     1.2258        100% MAX    670488    99%      670488    670488         .
MEAN          670488  SUM          821884         75% Q3     670488    95%      670488         .         .
STD DEV            .  VARIANCE          .         50% MED    670488    90%      670488         .         .
SKEWNESS           .  KURTOSIS          .         25% Q1     670488    10%      670488         .         .
USS        5.511E+11  CSS               0          0% MIN    670488     5%      670488         .    670488
CV                 .  STD MEAN          .                               1%      670488
T:MEAN=0           .  PROB>|T|          .        RANGE            0
SGN RANK         0.5  PROB>|S|          1        Q3-Q1            0
NUM ¬= 0           1                             MODE        670488
```

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                                          SAS                                  14:18 TUESDAY, JULY 29, 1986   34
                           PREPARED BY DPRA, REQUEST NUMBER  A0856C
                        DATA SOURCE: RIA MAIL SURVEY TSD GENERAL VERSION 3
                                    SOLVENT CATAGORY 1
                                   ** SORT BY T17ZD **

                    DST=SURFACE IMPOUNDMENT DISPOSAL ONLY CATEGORY=D-FIELD = 400 TO 499

                                        UNIVARIATE

VARIABLE=VOLUME
WEIGHT  =TWGHT          WEIGHT

                                                    QUANTILES(DEF=4)                              EXTREMES
             MOMENTS
                                                                                             LOWEST   HIGHEST
N                 3  SUM WGTS      3.9079     100% MAX    757805     99%      757805              1         .
MEAN         464005  SUM          1813287      75% Q3     757805     95%      757805         645854         .
STD DEV      465691  VARIANCE   2.169E+11      50% MED    645854     90%      757805         757805         1
SKEWNESS          .  KURTOSIS           .      25% Q1          1     10%           1              .    645854
USS       1.275E+12  CSS        4.337E+11       0% MIN         1      5%           1              .    757805
CV          100.363  STD MEAN      268867                             1%           1
T:MEAN=0    1.72578  PROB>|T|    0.226528     RANGE       757804
SGN RANK          3  PROB>|S|    0.181449     Q3-Q1       757804
NUM ¬= 0          3                           MODE             1
```

```
                                          SAS                                     14:18 TUESDAY, JULY 29, 1986   37
                            PREPARED BY DPRA, REQUEST NUMBER  A0856C
                      DATA SOURCE: RIA MAIL SURVEY TSD GENERAL VERSION 3
                                    SOLVENT CATAGORY 1
                                     ** SORT BY T17H **

-----------------------------------DST=TREATMENT AND STORAGE IN SI DST=TREATMENT AND STORAGE IN SI-----------------------------------

OBS    FACILITY      WCODE        VOLUME  WEIGHT      WEIGHT  D-FIELD  CC1    CC2    CC3    CC4    CC5    CC6    CC7  CC8  T17G  T17D  T17J
        ID                                            VOLUME

 36   TXD008079212  F005        2000000  1.3042     2608400    306     E295                                                2     3    .
 37   MID002931228  F005          15122  2.2241       33633    502     U220   U159                                         2    11    .
 38   PAD082434747  F005           6400  2.3723       15183    400     U140                                                2     3    .
 39   TX6213820529  F005            950  1.4225        1351    400     U159                                                2     3    .
→40   MIT270010044  F005              A  1.9178           .    400                                                         2     3    .   Changed to organic liquid
 41   PAD082434747  X038           2220  2.3723        5267    400     F005   U159                                         2     3    .
 42   SCD048373468  X173     1113682074  1.4765  1644351582    301     D002   D007   F002   F003   F004   U188              2     3    .   Mixed waste now included

----------------------------DST=SURFACE IMPOUNDMENT DISPOSAL ONLY DST=SURFACE IMPOUNDMENT DISPOSAL ONLY----------------------------

     OBS    FACILITY      WCODE   VOLUME  WEIGHT   WEIGHT  D-FIELD  CC1    CC2    CC3  CC4  CC5  CC6  CC7  CC8  T17G  T17D  T17J
             ID                                    VOLUME

     43   TXD007377278  F001         1  1.3128        1    401     U211                                          .     .     3
     44   NCD001810365  F002   4303659  1.1744  5054217    201     004X                                          .     .     3
     45   NCD001810365  F002    801220  1.1744   940953    203     006X                                          .     .     3
     46   NCD001810365  F002    126585  1.1744   148661    202     034X                                          .     .     3
     47   TXD980626774  F003    645854  1.3693   884368    400     U154   047X                                   .     .     3
     48   ALD000622464  F005    757805  1.2258   928917    401                                                   .     .     7

----------------------------------DST=TREATMENT AND DISPOSAL IN SI DST=TREATMENT AND DISPOSAL IN SI----------------------------------

       OBS    FACILITY     WCODE  VOLUME  WEIGHT  WEIGHT  D-FIELD  CC1    CC2  CC3  CC4  CC5  CC6  CC7  CC8  T17G  T17D  T17J
               ID                                 VOLUME

       49   ALD000622464  F001   670488  1.2258  821884    408     F017                                      2     .     7
```

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                                         SAS                                        14:18 TUESDAY, JULY 29, 1986   36
                            PREPARED BY OPRA, REQUEST NUMBER  A0856C
                         DATA SOURCE: RIA MAIL SURVEY TSD GENERAL VERSION 3
                                      SOLVENT CATAGORY 1
                                       ** SORT BY T17H **

----------------------------DST=SURFACE IMPOUNDMENT TREATMENT ONLY DST=SURFACE IMPOUNDMENT TREATMENT ONLY---------------------------

  OBS    FACILITY      WCODE    VOLUME    WEIGHT   WEIGHT     D-FIELD  CC1    CC2    CC3    CC4  CC5  CC6  CC7  CC8  T17G  T17D  T17J
           ID                                      VOLUME

    1   LAD043426006   F001   160487823  1.1522  184914070     301                                                    5     1     1
    2   TX3213820738   F002           A  1.5314          .     502    U226                                            2     2     A
-->3    XXX999999002   F003   148853634  1.1595  172595789     400 301                                                2     .     1    Changed to wastewater
-->4    VAD003122165   F003    18710002  1.5115   28280168     400 301                                                2     .     .      "       "       "
    5   XXX999999080   F003       65000  1.4546      94549     400                                                    7     6     .
    6   ILD005215769   F003       10244  2.6992      27651     502    U002                                            2     .     .
    7   XXX999999110   F005      100488  1.3456     135217     400                                                   12     6     .
    8   ILD005215769   F005       16098  2.6992      43452     502    U154                                            2     .     .
    9   XXX999999110   X002       20122  1.3456      27076     400    F003   F005                                    12     6     .
-->10   IND050530872   X018     1663659  1.5512    2580668     500 301F002   F003   F005                             2     .     2       "       "       "

----------------------------DST=SURFACE IMPOUNDMENT STORAGE ONLY DST=SURFACE IMPOUNDMENT STORAGE ONLY-------------------------------

  OBS    FACILITY      WCODE    VOLUME    WEIGHT   WEIGHT     D-FIELD  CC1    CC2    CC3  CC4  CC5  CC6  CC7  CC8  T17G  T17D  T17J
           ID                                      VOLUME

   11   TXD078432457   F001   153658553  1.1135  171098799     301                                                3     7     1
   12   XXX999999103   F002    35000000  2.2097   77339500     400                                                A     7     .
   13   CAD000030494   F002      404634  1.0951     443115     401                                                .     3     .
   14   CAD001705235   F002      170842  1.2982     221787     301                                                .    11     .
   15   MSD007037278   F002        8500  2.2097      18782     502                                                .     3     .
   16   MID011136884   F003    21382929  2.1074   45062365     502    U154                                        .     3     .
   17   MID011136884   F003     5902440  2.1074   12438802     203                                                4     3     .
   18   MID096963194   F003      900000  1.4940    1344600       0                                                .     3     .
   19   TXD066447376   F003          15  2.2350         34     401                                                .     7     .
   20   TXD096618855   F003           B  2.6992          .     301    U154   U031                                 4     3     .
   21   MID096963194   F005      800000  1.4940    1195200     401                                                .     3     .
   22   TXD066447376   F005           5  2.2350         11     401

------------------------------DST=TREATMENT AND STORAGE IN SI DST=TREATMENT AND STORAGE IN SI---------------------------------------

  OBS    FACILITY      WCODE         VOLUME  WEIGHT       WEIGHT  D-FIELD  CC1   CC2   CC3   CC4   CC5   CC6   CC7  CC8  T17G  T17D  T17J
           ID                                             VOLUME

   23   OHD020273819   F001          418091  1.1645       486867    500    001X                                          2     3     1
   24   PAD004397683   F001           22195  2.0284        45020    400                                                  2     3     .
   25   TX6213820529   F001           20600  1.4225        29303    400    U226                                          2     3     .
   26   PAD082434747   F001            3100  2.3723         7354    401    X995                                          2     3     .
-->27   MII270010044   F001               A  1.9178            .     400                                                 2     3     .    Changed to organic liquid
   28   OHD020273819   F002         3001668  1.1645      3495442    502    005X                                          2     3     1
   29   PAD004397683   F002           43902  2.0284        89051    400                                                  2     3     .
   30   TX6213820529   F002            1185  1.4225         1686    400    U080                                          2     3     .
-->31   MII270010044   F002               A  1.9178            .     400                                                 2     3     .      "      "      "      "
   32   OHD020273819   F003          179719  1.1645       209283    502                                                  2     3     1
   33   TX6213820529   F003            1180  1.4225         1679    400    U002                                          7     3     .
-->34   MII270010044   F003               A  1.9178                  400                                                 2     3     .      "      "      "      "
   35   TXD008079212   F005       341463452  1.3042    445336634    301    E295                                          2     3     .
```

```
                                     SAS                                    14:18 TUESDAY, JULY 29, 1986   39
                     PREPARED BY DPRA, REQUEST NUMBER  A0856C
                   DATA SOURCE: RIA MAIL SURVEY TSD GENERAL VERSION 3
                               SOLVENT CATAGORY 1
                               ** SORT BY T17W **

                    DST=SURFACE IMPOUNDMENT TREATMENT ONLY WCODE=F002

                                   UNIVARIATE

VARIABLE=VOLUME
WEIGHT   =TWGHT           WEIGHT

                              MISSING VALUE        A
                                      COUNT        1
                               % COUNT/NOBS   100.00
```

```
                                              SAS                                         14:18 TUESDAY, JULY 29, 1986   38
                                PREPARED BY DPRA, REQUEST NUMBER  A0856C
                              DATA SOURCE: RIA MAIL SURVEY TSD GENERAL VERSION 3
                                          SOLVENT CATAGORY 1
                                          ** SORT BY T17W **

                              DST=SURFACE IMPOUNDMENT TREATMENT ONLY WCODE=F001

                                              UNIVARIATE

VARIABLE=VOLUME
WEIGHT  =IWGHT         WEIGHT

                                                         QUANTILES(DEF=4)                                    EXTREMES
              MOMENTS
                                                                                                       LOWEST    HIGHEST
N                  1  SUM WGTS      1.1522        100% MAX  160487823       99%    160487808        160487823          .
MEAN       160487823  SUM        184914070         75% Q3   160487808       95%    160487808                .          .
STD DEV            .  VARIANCE           .         50% MED  160487808       90%    160487808                .          .
SKEWNESS           .  KURTOSIS           .         25% Q1   160487808       10%    160487808                .          .
USS        2.968E+16  CSS                0          0% MIN  160487823        5%    160487808                .  160487823
CV                 .  STD MEAN           .                                   1%    160487808
T:MEAN=0           .  PROB>|T|           .        RANGE             0
SGN RANK         0.5  PROB>|S|           1        Q3-Q1             0
NUM ^= 0           1                              MODE      160487808
```

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                                                 SAS                                  14:18 TUESDAY, JULY 29, 1986   41
                                PREPARED BY DPRA, REQUEST NUMBER  A0856C
                              DATA SOURCE: RIA MAIL SURVEY TSD GENERAL VERSION 3
                                         SOLVENT CATAGORY 1
                                         ** SORT BY T17W **

                              DST=SURFACE IMPOUNDMENT TREATMENT ONLY WCODE=F005

                                              UNIVARIATE

VARIABLE=VOLUME
WEIGHT  =TWGHT          WEIGHT

               MOMENTS                                         QUANTILES(DEF=4)                              EXTREMES

N                    2  SUM WGTS        4.0448      100% MAX     100488      99%       100488          LOWEST    HIGHEST
MEAN           44172.4  SUM             178668       75% Q3      100488      95%       100488           16098          .
STD DEV        79968.3  VARIANCE    6394932507       50% MED      58293      90%       100488          100488          .
SKEWNESS             .  KURTOSIS             .       25% Q1       16098      10%        16098               .          .
USS          1.429E+10  CSS         6394932507        0% MIN      16098       5%        16098               .      16098
CV             181.037  STD MEAN       56546.1                                1%        16098               .     100488
T:MEAN=0      0.781174  PROB>|T|      0.577822       RANGE        84390
SGN RANK           1.5  PROB>|S|      0.371093       Q3-Q1        84390
NUM ^= 0             2                               MODE         16098
```

```
                                        SAS                               14:18 TUESDAY, JULY 29, 1986   40
                         PREPARED BY DPRA, REQUEST NUMBER  A0856C
                     DATA SOURCE: RIA MAIL SURVEY TSD GENERAL VERSION 3
                                  SOLVENT CATAGORY 1
                                  ** SORT BY T17H **

                     DST=SURFACE IMPOUNDMENT TREATMENT ONLY WCODE=F003

                                      UNIVARIATE

VARIABLE=VOLUME
WEIGHT  =IWGHT          WEIGHT

              MOMENTS                                    QUANTILES(DEF=4)                          EXTREMES

N                  4  SUM WGTS      6.8248        100% MAX  148853634      99%    148853632        LOWEST    HIGHEST
MEAN        29451142  SUM        200998156         75% Q3   116317724      95%    148853632         10244          .
STD DEV     82261805  VARIANCE   6.767E+15         50% MED    9387500      90%    148853632         65000      10244
SKEWNESS           .  KURTOSIS           .         25% Q1       23933      10%        10244      18710002      65000
USS        2.622E+16  CSS        2.030E+16          0% MIN      10244       5%        10244     148853634   18710002
CV           279.316  STD MEAN    41130902                                  1%        10244             .  148853634
T:MEAN=0    0.716034  PROB>|T|    0.525674        RANGE     148843390
SGN RANK           5  PROB>|S|    0.100348        Q3-Q1     116293791
NUM ¬= 0           4                              MODE          10244
```

```
                                              SAS                                  14:18 TUESDAY, JULY 29, 1986   43
                                PREPARED BY OPRA, REQUEST NUMBER  A0856C
                            DATA SOURCE: RIA MAIL SURVEY TSD GENERAL VERSION 3
                                        SOLVENT CATAGORY 1
                                         ** SORT BY T17H **

                             DST=SURFACE IMPOUNDMENT TREATMENT ONLY WCODE=X018

                                            UNIVARIATE

VARIABLE=VOLUME
WEIGHT  =TWGHT           WEIGHT

                                                                                                     EXTREMES
                                                                 QUANTILES(DEF=4)
               MOMENTS                                                                           LOWEST   HIGHEST
                                                     100% MAX    1663659     99%      1663659   1663659         .
N                    1  SUM WGTS      1.5512          75% Q3     1663659     95%      1663659         .         .
MEAN           1663659  SUM          2580668          50% MED    1663659     90%      1663659         .         .
STD DEV              .  VARIANCE           .          25% Q1     1663659     10%      1663659         .         .
SKEWNESS             .  KURTOSIS           .           0% MIN    1663659      5%      1663659         .   1663659
USS          4.293E+12  CSS                0                                  1%      1663659
CV                   .  STD MEAN           .         RANGE             0
T:MEAN=0             .  PROB>|T|           .         Q3-Q1             0
SGN RANK           0.5  PROB>|S|           1         MODE        1663659
NUM ^= 0             1
```

```
                                                     SAS
                              PREPARED BY DPRA, REQUEST NUMBER  A0856C
                          DATA SOURCE: RIA MAIL SURVEY TSD GENERAL VERSION 3
                                            SOLVENT CATAGORY 1
                                             ** SORT BY T17W **

                          DST=SURFACE IMPOUNDMENT TREATMENT ONLY WCODE=X002

                                                 UNIVARIATE

VARIABLE=VOLUME
WEIGHT  =TWGHT          WEIGHT

                 MOMENTS                                          QUANTILES(DEF=4)                                   EXTREMES

N                    1  SUM WGTS      1.3456          100% MAX       20122      99%          20122            LOWEST    HIGHEST
MEAN             20122  SUM          27076.2           75% Q3        20122      95%          20122             20122          .
STD DEV              .  VARIANCE           .           50% MED       20122      90%          20122                 .          .
SKEWNESS             .  KURTOSIS           .           25% Q1        20122      10%          20122                 .          .
USS          544826556  CSS                0            0% MIN       20122       5%          20122                 .          .
CV                   .  STD MEAN           .                                     1%          20122                 .      20122
T:MEAN=0             .  PROB>|T|           .          RANGE              0
SGN RANK           0.5  PROB>|S|           1          Q3-Q1              0
NUM ¬= 0             1                                MODE           20122
```

```
                                              SAS                                14:18 TUESDAY, JULY 29, 1986   45
                                  PREPARED BY DPRA, REQUEST NUMBER  A0856C
                               DATA SOURCE: RIA MAIL SURVEY TSD GENERAL VERSION 3
                                           SOLVENT CATAGORY 1
                                          ** SORT BY T17W **

                               DST=SURFACE IMPOUNDMENT STORAGE ONLY WCODE=F002

                                              UNIVARIATE

VARIABLE=VOLUME
WEIGHT  =IWGHT          WEIGHT

                MOMENTS                                       QUANTILES(DEF=4)                          EXTREMES

                                                                                                    LOWEST    HIGHEST
N                 4.  SUM WGTS      6.8127         100% MAX   35000000     99%     35000000           8500          .
MEAN        11452608  SUM         78023184          75% Q3    26351159     95%     35000000         170842       8500
STD DEV     24586791  VARIANCE   6.045E+14          50% MED     287738     90%     35000000         404634     170842
SKEWNESS           .  KURTOSIS           .          25% Q1     49085.5     10%         8500       35000000     404634
USS        2.707E+15  CSS        1.814E+15           0% MIN       8500      5%         8500              .   35000000
CV           214.683  STD MEAN    12293396                                  1%         8500
T:MEAN=0    0.931607  PROB>|T|     0.42026          RANGE     34991500
SGN RANK           5  PROB>|S|    0.100348          Q3-Q1     26302073
NUM ^= 0           4                                MODE          8500
```

```
                                             SAS                                   14:18 TUESDAY, JULY 29, 1986   44
                              PREPARED BY DPRA, REQUEST NUMBER  A0856C
                         DATA SOURCE: RIA MAIL SURVEY TSD GENERAL VERSION 3
                                     SOLVENT CATAGORY 1
                                      ** SORT BY T17W **

                           DST=SURFACE IMPOUNDMENT STORAGE ONLY WCODE=F001

                                          UNIVARIATE

VARIABLE=VOLUME
WEIGHT  =TWGHT          WEIGHT

                                                QUANTILES(DEF=4)                           EXTREMES
              MOMENTS
                                                                                        LOWEST    HIGHEST
N                  1  SUM WGTS     1.1135    100% MAX  153658553    99%   153658544   153658553         .
MEAN       153658553  SUM       171098799     75% Q3   153658544    95%   153658544           .         .
STD DEV            .  VARIANCE          .     50% MED  153658544    90%   153658544           .         .
SKEWNESS           .  KURTOSIS          .     25% Q1   153658544    10%   153658544           .         .
USS        2.629E+16  CSS               0      0% MIN  153658553     5%   153658544           . 153658553
CV                 .  STD MEAN          .                            1%   153658544
T:MEAN=0           .  PROB>|T|          .    RANGE             0
SGN RANK         0.5  PROB>|S|          1    Q3-Q1             0
NUM ¬= 0           1                         MODE      153658544
```

```
                                              SAS                                 14:18 TUESDAY, JULY 29, 1986   47
                               PREPARED BY OPRA, REQUEST NUMBER  A0856C
                           DATA SOURCE: RIA MAIL SURVEY TSD GENERAL VERSION 3
                                          SOLVENT CATAGORY 1
                                          ** SORT BY T17H **

                            DST=SURFACE IMPOUNDMENT STORAGE ONLY WCODE=F005

                                              UNIVARIATE

VARIABLE=VOLUME
WEIGHT  =TWGHT          WEIGHT

               MOMENTS                                          QUANTILES(DEF=4)                                EXTREMES

N                 2  SUM WGTS       3.729          100% MAX     800000       99%        800000          LOWEST    HIGHEST
MEAN         320518  SUM          1195211           75% Q3      800000       95%        800000               5          .
STD DEV      757016  VARIANCE   5.731E+11           50% MED     400003       90%        800000          800000          .
SKEWNESS          .  KURTOSIS           .           25% Q1           5       10%             5               .          .
USS       9.562E+11  CSS        5.731E+11            0% MIN          5        5%             5               .          5
CV          236.185  STD MEAN      535291                                     1%             5               .     800000
T:MEAN=0   0.598773  PROB>|T|    0.656533          RANGE        799995
SGN RANK        1.5  PROB>|S|    0.371093          Q3-Q1        799995
NUM ^= 0          2                                MODE              5
```

```
                                                   SAS                              14:18 TUESDAY, JULY 29, 1986   46
                                    PREPARED BY DPRA, REQUEST NUMBER  A0856C
                                DATA SOURCE: RIA MAIL SURVEY TSD GENERAL VERSION 3
                                               SOLVENT CATAGORY 1
                                               ** SORT BY T17M **

                                   DST=SURFACE IMPOUNDMENT STORAGE ONLY WCODE=F003

                                                    UNIVARIATE

VARIABLE=VOLUME
WEIGHT   =TWGHT          WEIGHT

                                                           QUANTILES(DEF=4)                                 EXTREMES
                  MOMENTS
                                                                                                       LOWEST    HIGHEST
N                  4  SUM WGTS       7.9438        100% MAX   21382929      99%     21382928              15          .
MEAN         7407767  SUM          58845820         75% Q3    17512806      95%     21382928          900000         15
STD DEV     14168969  VARIANCE    2.008E+14         50% MED    3401220      90%     21382928         5902440     900000
SKEWNESS           .  KURTOSIS            .         25% Q1      225011      10%           15        21382929    5902440
USS        1.038E+15  CSS         6.023E+14          0% MIN         15       5%           15               .   21382929
CV           191.272  STD MEAN      7084485                                  1%           15
T:MEAN=0     1.04563  PROB>|T|      0.37256        RANGE      21382914
SGN RANK           5  PROB>|S|     0.100348        Q3-Q1      17287795
NUM ¬= 0           4                               MODE             15

                                                   MISSING VALUE         B
                                                           COUNT         1
                                                    % COUNT/NOBS     20.00
```

```
                                        SAS                                    14:18 TUESDAY, JULY 29, 1986   49
                          PREPARED BY DPRA, REQUEST NUMBER  A0856C
                       DATA SOURCE: RIA MAIL SURVEY TSD GENERAL VERSION 3
                                  SOLVENT CATAGORY 1
                                   ** SORT BY T17W **

                        DST=TREATMENT AND STORAGE IN SI WCODE=F002

                                      UNIVARIATE

VARIABLE=VOLUME
WEIGHT  =TWGHT           WEIGHT

                                                         QUANTILES(DEF=4)                          EXTREMES
               MOMENTS
                                                                                             LOWEST    HIGHEST
N                  3  SUM WGTS     4.6154     100% MAX   3001668     99%    3001668          1185          .
MEAN          777003  SUM         3586179      75% Q3    3001668     95%    3001668         43902          .
STD DEV      1963364  VARIANCE  3.855E+12      50% MED     43902     90%    3001668       3001668       1185
SKEWNESS           .  KURTOSIS          .      25% Q1       1185     10%       1185             .      43902
USS        1.050E+13  CSS       7.710E+12       0% MIN      1185      5%       1185             .    3001668
CV           252.684  STD MEAN    1133549                             1%       1185
T:MEAN=0     0.68546  PROB>|T|   0.563839     RANGE      3000483
SGN RANK           3  PROB>|S|   0.181449     Q3-Q1      3000483
NUM ^= 0           3                          MODE          1185

                                              MISSING VALUE      A
                                                      COUNT      1
                                               % COUNT/NOBS  25.00
```

```
                                                   SAS                                    14:18 TUESDAY, JULY 29, 1986   48
                                  PREPARED BY DPRA, REQUEST NUMBER  A0856C
                             DATA SOURCE: RIA MAIL SURVEY TSD GENERAL VERSION 3
                                           SOLVENT CATAGORY 1
                                            ** SORT BY T17W **

                                  DSI=TREATMENT AND STORAGE IN SI WCODE=F001

                                                 UNIVARIATE

VARIABLE=VOLUME
WEIGHT   =TWGHT            WEIGHT

                                                         QUANTILES(DEF=4)                             EXTREMES
                  MOMENTS
                                                                                                LOWEST    HIGHEST
N                     4  SUM WGTS     6.9877      100% MAX    418091     99%     418091          3100          .
MEAN            81363.7  SUM          568545       75% Q3     319117     95%     418091         20600       3100
STD DEV          230160  VARIANCE  5.297E+10       50% MED   21397.5     90%     418091         22195      20600
SKEWNESS              .  KURTOSIS          .       25% Q1       7475     10%       3100        418091      22195
USS           2.052E+11  CSS       1.589E+11        0% MIN      3100      5%       3100             .     418091
CV              282.879  STD MEAN     115080                              1%       3100
T:MEAN=0       0.707017  PROB>|T|   0.530526      RANGE       414991
SGN RANK              5  PROB>|S|   0.100348      Q3-Q1       311642
NUM ~= 0              4                           MODE          3100

                                                  MISSING VALUE        A
                                                          COUNT        1
                                                   % COUNT/NOBS    20.00
```

```
                                              SAS                                 14:18 TUESDAY, JULY 29, 1986   51
                              PREPARED BY OPRA, REQUEST NUMBER  A0856C
                         DATA SOURCE: RIA MAIL SURVEY TSD GENERAL VERSION 3
                                        SOLVENT CATAGORY 1
                                         ** SORT BY T17W **

                              DST=TREATMENT AND STORAGE IN SI WCODE=F005

                                            UNIVARIATE

VARIABLE=VOLUME
WEIGHT  =TWGHT          WEIGHT

                MOMENTS                                          QUANTILES(DEF=4)                                  EXTREMES

N                   5  SUM WGTS       8.6273        100% MAX  341463452       99%     341463296           LOWEST    HIGHEST
MEAN         51927625  SUM         447995201         75% Q3   171731648       95%     341463296              950        950
STD DEV     179449209  VARIANCE    3.220E+16         50% MED      15122       90%     341463296             6400       6400
SKEWNESS            .  KURTOSIS            .         25% Q1        3675       10%           950            15122      15122
USS         1.521E+17  CSS         1.288E+17          0% MIN        950        5%           950          2000000    2000000
CV            345.576  STD MEAN     80252126                                   1%           950        341463452  341463452
T:MEAN=0     0.647056  PROB>|T|     0.552855         RANGE    341462502
SGN RANK          7.5  PROB>|S|    0.0590582         Q3-Q1    171727973
NUM ^= 0            5                                MODE           950

                                                    MISSING VALUE       A
                                                            COUNT       1
                                                     % COUNT/NOBS   16.67
```

```
                                          SAS                              14:18 TUESDAY, JULY 29, 1986   50
                           PREPARED BY DPRA, REQUEST NUMBER  A0856C
                      DATA SOURCE: RIA MAIL SURVEY TSD GENERAL VERSION 3
                                   SOLVENT CATAGORY 1
                                   ** SORT BY T17H **

                          DST=TREATMENT AND STORAGE IN SI WCODE=F003

                                       UNIVARIATE

VARIABLE=VOLUME
WEIGHT  =TWGHT          WEIGHT .

                 MOMENTS                                 QUANTILES(DEF=4)                           EXTREMES

N                  2  SUM WGTS      2.587        100% MAX     179719     99%      179719          LOWEST   HIGHEST
MEAN         81546.7  SUM          210961         75% Q3      179719     95%      179719            1180         .
STD DEV       142867  VARIANCE  2.041E+10         50% MED    90449.5     90%      179719          179719         .
SKEWNESS           .  KURTOSIS          .         25% Q1        1180     10%        1180               .         .
USS        3.761E+10  CSS       2.041E+10          0% MIN       1180      5%        1180               .      1180
CV           175.196  STD MEAN     101022                                 1%        1180               .    179719
T:MEAN=0    0.807218  PROB>|T|   0.567655         RANGE       178539
SGN RANK         1.5  PROB>|S|   0.371093         Q3-Q1       178539
NUM ^= 0           2                              MODE          1180

                                                  MISSING VALUE      A
                                                          COUNT      1
                                                   % COUNT/NOBS  33.33
```

```
                                                                SAS                                14:18 TUESDAY, JULY 29, 1986   53
                                              PREPARED BY DPRA, REQUEST NUMBER  A0856C
                                         DATA SOURCE: RIA MAIL SURVEY TSD GENERAL VERSION 3
                                                         SOLVENT CATAGORY 1
                                                         ** SORT BY T17W **

                                             DST=TREATMENT AND STORAGE IN SI WCODE=X173

                                                             UNIVARIATE

VARIABLE=VOLUME
WEIGHT  =TWGHT          WEIGHT

                 MOMENTS                                            QUANTILES(DEF=4)                                EXTREMES

N                  1  SUM WGTS       1.4765             100% MAX 1113682074     99%    1113681920                  LOWEST    HIGHEST
MEAN      1113682074  SUM        1644351582              75% Q3  1113681920     95%    1113681920              1113682074          .
STD DEV            .  VARIANCE            .              50% MED 1113681920     90%    1113681920                       .          .
SKEWNESS           .  KURTOSIS            .              25% Q1  1113681920     10%    1113681920                       .          .
USS        1.831E+18  CSS                 0               0% MIN 1113682074      5%    1113681920                       .          .
CV                 .  STD MEAN            .                                      1%    1113681920                       .  1113682074
T:MEAN=0           .  PROB>|T|            .              RANGE            0
SGN RANK         0.5  PROB>|S|            1              Q3-Q1            0
NUM ¬= 0           1                                     MODE    1113681920
```

```
                                            SAS                                     14:18 TUESDAY, JULY 29, 1986   52
                          PREPARED BY DPRA, REQUEST NUMBER  A0856C
                    DATA SOURCE: RIA MAIL SURVEY TSD GENERAL VERSION 3
                                     SOLVENT CATAGORY 1
                                     ** SORT BY T17N **

                         DST=TREATMENT AND STORAGE IN SI WCODE=X038

                                         UNIVARIATE

VARIABLE=VOLUME
WEIGHT  =IWGHT          WEIGHT

                                                           QUANTILES(DEF=4)                          EXTREMES
                 MOMENTS
                                                                                                 LOWEST   HIGHEST
                                                  100% MAX        2220      99%         2220       2220         .
N                    1  SUM WGTS       2.3723      75% Q3         2220      95%         2220          .         .
MEAN              2220  SUM           5266.51      50% MED        2220      90%         2220          .         .
STD DEV              .  VARIANCE            .      25% Q1         2220      10%         2220          .         .
SKEWNESS             .  KURTOSIS            .       0% MIN        2220       5%         2220          .      2220
USS           11691643  CSS                 0                                1%         2220
CV                   .  STD MEAN            .      RANGE             0
T:MEAN=0             .  PROB>|T|            .      Q3-Q1             0
SGN RANK           0.5  PROB>|S|            1      MODE           2220
NUM ^= 0             1
```

```
                                              SAS                                 14:18 TUESDAY, JULY 29, 1986   55
                                PREPARED BY DPRA, REQUEST NUMBER  A0856C
                             DATA SOURCE: RIA MAIL SURVEY TSD GENERAL VERSION 3
                                          SOLVENT CATAGORY 1
                                          ** SORT BY T17M **

                              DST=SURFACE IMPOUNDMENT DISPOSAL ONLY WCODE=F002

                                              UNIVARIATE

VARIABLE=VOLUME
WEIGHT   =TWGHT           WEIGHT

                                                    QUANTILES(DEF=4)                                  EXTREMES
               MOMENTS
                                                                                                LOWEST    HIGHEST
N                 3  SUM WGTS      3.5232      100% MAX   4303659     99%      4303659           126585          .
MEAN        1743821  SUM          6143831       75% Q3    4303659     95%      4303659           801220          .
STD DEV     2430083  VARIANCE   5.905E+12       50% MED    801220     90%      4303659          4303659     126585
SKEWNESS          .  KURTOSIS           .       25% Q1     126585     10%       126585                .     801220
USS       2.252E+13  CSS        1.181E+13        0% MIN    126585      5%       126585                .    4303659
CV          139.354  STD MEAN     1403009                              1%       126585
T:MEAN=0    1.24291  PROB>|T|    0.339849       RANGE     4177074
SGN RANK          3  PROB>|S|    0.181449       Q3-Q1     4177074
NUM ¬= 0          3                             MODE       126585
```

```
                                                 SAS                                 14:18 TUESDAY, JULY 29, 1986   54
                                  PREPARED BY DPRA, REQUEST NUMBER  A0856C
                              DATA SOURCE: RIA MAIL SURVEY TSD GENERAL VERSION 3
                                            SOLVENT CATAGORY 1
                                            ** SORT BY T17H **

                                DST=SURFACE IMPOUNDMENT DISPOSAL ONLY WCODE=F001

                                              UNIVARIATE

VARIABLE=VOLUME
WEIGHT  =TWGHT          WEIGHT

               MOMENTS                                     QUANTILES(DEF=4)                        EXTREMES

N                  1  SUM WGTS      1.3128          100% MAX       1     99%          1          LOWEST    HIGHEST
MEAN               1  SUM           1.3128           75% Q3        1     95%          1               1          .
STD DEV            .  VARIANCE           .           50% MED       1     90%          1               .          .
SKEWNESS           .  KURTOSIS           .           25% Q1        1     10%          1               .          .
USS           1.3128  CSS                0            0% MIN       1      5%          1               .          .
CV                 .  STD MEAN           .                                1%          1               .          1
T:MEAN=0           .  PROB>|T|           .          RANGE          0
SGN RANK         0.5  PROB>|S|           1          Q3-Q1          0
NUM ^= 0           1                                MODE           1
```

```
                                                        SAS                                   14:18 TUESDAY, JULY 29, 1986   57
                                      PREPARED BY DPRA, REQUEST NUMBER  A0856C
                                    DATA SOURCE: RIA MAIL SURVEY TSD GENERAL VERSION 3
                                                  SOLVENT CATAGORY 1
                                                  ** SORT BY T17H **

                                      DST=SURFACE IMPOUNDMENT DISPOSAL ONLY WCODE=F005

                                                      UNIVARIATE

VARIABLE=VOLUME
WEIGHT  =TWGHT          WEIGHT

                 MOMENTS                                          QUANTILES(DEF=4)                               EXTREMES

N                  1  SUM WGTS       1.2258         100% MAX     757805      99%        757805          LOWEST    HIGHEST
MEAN          757805  SUM            928917          75% Q3      757805      95%        757805          757805          .
STD DEV            .  VARIANCE            .          50% MED     757805      90%        757805               .          .
SKEWNESS           .  KURTOSIS            .          25% Q1      757805      10%        757805               .          .
USS       7.039E+11  CSS                 0           0% MIN     757805       5%        757805               .          .
CV                 .  STD MEAN            .                                   1%        757805               .     757805
T:MEAN=0           .  PROB>|T|            .         RANGE            0
SGN RANK         0.5  PROB>|S|            1         Q3-Q1            0
NUM ^= 0           1                                MODE        757805
```

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                                                 SAS                                  14:18 TUESDAY, JULY 29, 1986   56
                                PREPARED BY DPRA, REQUEST NUMBER  A0856C
                             DATA SOURCE: RIA MAIL SURVEY TSD GENERAL VERSION 3
                                          SOLVENT CATAGORY 1
                                          ** SORT BY T17W **

                              DST=SURFACE IMPOUNDMENT DISPOSAL ONLY WCODE=F003

                                              UNIVARIATE

VARIABLE=VOLUME
WEIGHT  =TWGHT          WEIGHT

               MOMENTS                                        QUANTILES(DEF=4)                          EXTREMES

N                    1  SUM WGTS      1.3693        100% MAX     645854     99%     645854        LOWEST    HIGHEST
MEAN            645854  SUM           884368         75% Q3      645854     95%     645854        645854          .
STD DEV              .  VARIANCE           .         50% MED     645854     90%     645854             .          .
SKEWNESS             .  KURTOSIS           .         25% Q1      645854     10%     645854             .          .
USS          5.712E+11  CSS                0          0% MIN     645854      5%     645854             .          .
CV                   .  STD MEAN           .                                 1%     645854             .     645854
T:MEAN=0             .  PROB>|T|           .        RANGE             0
SGN RANK           0.5  PROB>|S|           1        Q3-Q1             0
NUM ^= 0             1                              MODE         645854
```

```
                                         SAS                                 14:18 TUESDAY, JULY 29, 1986   59
                          PREPARED BY DPRA, REQUEST NUMBER  A0856C
                      DATA SOURCE: RIA MAIL SURVEY TSD GENERAL VERSION 3
                                  SOLVENT CATAGORY 1
       †       T17D=4 OR T17D=8 OR T17D=9 OR T17D=12 OR T17D=15 OR T17D=16 OR T17D=17
                                 ** SORT BY T17ZD **

OBS    FACILITY     WCODE  VOLUME  WEIGHT  WEIGHT  D-FIELD  CC1   CC2  CC3  CC4  CC5  CC6  CC7  CC8  T17G  T17D  T17J
         ID                                VOLUME

 1   PAD990825408   F001     7190  1.2958    9317    401    U228                                      .     9     .
 2   IND081523284   F003     2195  1.7308    3799    408                                              .     4     .
 3   IAD005272398   F003   531463  1.3731  729752    502                                              1     4     .
```

```
                                              SAS                                         14:18 TUESDAY, JULY 29, 1986   58
                               PREPARED BY DPRA, REQUEST NUMBER  A0856C
                             DATA SOURCE: RIA MAIL SURVEY TSD GENERAL VERSION 3
                                         SOLVENT CATAGORY 1
                                          ** SORT BY T17M **

                               DST=TREATMENT AND DISPOSAL IN SI WCODE=F001

                                              UNIVARIATE

VARIABLE=VOLUME
WEIGHT   =TWGHT          WEIGHT

                  MOMENTS                                         QUANTILES(DEF=4)                                EXTREMES

                                                                                                              LOWEST    HIGHEST
N                     1  SUM WGTS       1.2258            100% MAX    670488     99%       670488             670488          .
MEAN             670488  SUM            821884             75% Q3     670488     95%       670488                  .          .
STD DEV               .  VARIANCE            .             50% MED    670488     90%       670488                  .          .
SKEWNESS              .  KURTOSIS            .             25% Q1     670488     10%       670488                  .          .
USS          5.511E+11  CSS                  0              0% MIN    670488      5%       670488                  .     670488
CV                    .  STD MEAN            .                                    1%       670488
T:MEAN=0              .  PROB>|T|            .            RANGE            0
SGN RANK            0.5  PROB>|S|            1            Q3-Q1            0
NUM ^= 0              1                                   MODE        670488
```

```
                                      SAS                             14:18 TUESDAY, JULY 29, 1986   61
                         PREPARED BY DPRA, REQUEST NUMBER  A0856C
                      DATA SOURCE: RIA MAIL SURVEY TSD GENERAL VERSION 3
                                  SOLVENT CATAGORY 1
              T17D=4 OR T17D=8 OR T17D=9 OR T17D=12 OR T17D=15 OR T17D=16 OR T17D=17
                                 ** SORT BY T17ZD **

                              CATEGORY=D-FIELD = 500 TO 599

                                      UNIVARIATE

VARIABLE=VOLUME
WEIGHT   =TWGHT          WEIGHT

            MOMENTS                                  QUANTILES(DEF=4)                          EXTREMES

N                  1  SUM WGTS     1.3731     100% MAX    531463     99%     531463          LOWEST    HIGHEST
MEAN          531463  SUM          729752      75% Q3     531463     95%     531463          531463          .
STD DEV            .  VARIANCE          .      50% MED    531463     90%     531463               .          .
SKEWNESS           .  KURTOSIS          .      25% Q1     531463     10%     531463               .          .
USS       3.878E+11  CSS               0        0% MIN    531463      5%     531463               .          .
CV                 .  STD MEAN          .                              1%     531463               .     531463
T:MEAN=0           .  PROB>|T|          .     RANGE           0
SGN RANK         0.5  PROB>|S|          1     Q3-Q1           0
NUM ^= 0           1                          MODE       531463
```

```
                                                   SAS                                   14:18 TUESDAY, JULY 29, 1986   60
                                    PREPARED BY DPRA, REQUEST NUMBER  A0856C
                                 DATA SOURCE: RIA MAIL SURVEY TSD GENERAL VERSION 3
                                               SOLVENT CATAGORY 1
                        T17D=4 OR T17D=8 OR T17D=9 OR T17D=12 OR T17D=15 OR T17D=16 OR T17D=17
                                             ** SORT BY T17ZD **

                                          CATEGORY=D-FIELD = 400 TO 499

                                                  UNIVARIATE

VARIABLE=VOLUME
WEIGHT   =TWGHT           WEIGHT

                                                            QUANTILES(DEF=4)                          EXTREMES
                 MOMENTS
                                                                                                 LOWEST    HIGHEST
N                   2  SUM WGTS       3.0266       100% MAX       7190      99%         7190        2195          .
MEAN          4333.55  SUM           13115.9        75% Q3        7190      95%         7190        7190          .
STD DEV       4299.82  VARIANCE     18488463        50% MED     4692.5      90%         7190           .          .
SKEWNESS            .  KURTOSIS            .        25% Q1        2195      10%         2195           .       2195
USS          75326844  CSS          18488463         0% MIN       2195       5%         2195           .       7190
CV            99.2218  STD MEAN      3040.43                                 1%         2195
T:MEAN=0      1.42531  PROB>|T|     0.389485       RANGE          4995
SGN RANK          1.5  PROB>|S|     0.371093       Q3-Q1          4995
NUM ^= 0            2                              MODE           2195
```

```
                                                SAS                                   14:18 TUESDAY, JULY 29, 1986   63
                                PREPARED BY DPRA, REQUEST NUMBER  A0856C
                              DATA SOURCE: RIA MAIL SURVEY TSD GENERAL VERSION 3
                                           SOLVENT CATAGORY 1
                  T17D=4 OR T17D=8 OR T17D=9 OR T17D=12 OR T17D=15 OR T17D=16 OR T17D=17
                                          ** SORT BY T17W **

                                              WCODE=F001

                                              UNIVARIATE

VARIABLE=VOLUME
WEIGHT  =TWGHT           WEIGHT

                                                            QUANTILES(DEF=4)                        EXTREMES
                  MOMENTS
                                                                                                LOWEST   HIGHEST
N                     1  SUM WGTS     1.2958        100% MAX       7190    99%        7190       7190         .
MEAN               7190  SUM          9316.8         75% Q3        7190    95%        7190          .         .
STD DEV               .  VARIANCE          .         50% MED       7190    90%        7190          .         .
SKEWNESS              .  KURTOSIS          .         25% Q1        7190    10%        7190          .         .
USS            66987806  CSS               0          0% MIN       7190     5%        7190          .      7190
CV                    .  STD MEAN          .                                1%        7190
T:MEAN=0              .  PROB>|T|          .        RANGE             0
SGN RANK            0.5  PROB>|S|          1        Q3-Q1             0
NUM ^= 0              1                             MODE           7190
```

```
                                            SAS                                14:18 TUESDAY, JULY 29, 1986   62
                           PREPARED BY DPRA, REQUEST NUMBER  A0856C
                        DATA SOURCE: RIA MAIL SURVEY TSD GENERAL VERSION 3
                               *      SOLVENT CATAGORY 1
                T17D=4 OR T17D=8 OR T17D=9 OR T17D=12 OR T17D=15 OR T17D=16 OR T17D=17
                                     ** SORT BY T17M **

OBS    FACILITY     WCODE  VOLUME  WEIGHT  WEIGHT  D-FIELD  CCI   CC2  CC3  CC4  CC5  CC6  CC7  CC8  T176  T17D  T17J
         ID                                VOLUME

 1   PAD990825408   F001.    7190  1.2958    9317    401    U228                                       .     9     .
 2   IAD005272398   F003   531463  1.3731  729752    502                                               1     4     .
 3   IND081523284   F003     2195  1.7308    3799    408                                               .     4     .
```

ATTACHMENT 2

ACCOUNTING OF SOLVENT WASTE VOLUMES PRESENTED

Source: 1981 RIA Mail Survey

```
                                                  SAS                             14:18 TUESDAY, JULY 29, 1986   64
                                 PREPARED BY DPRA, REQUEST NUMBER  A0856C
                               DATA SOURCE: RIA MAIL SURVEY TSD GENERAL VERSION 3
                                            SOLVENT CATAGORY 1
                     T17D=4 OR T17D=8 OR T17D=9 OR T17D=12 OR T17D=15 OR T17D=16 OR T17D=17
                                           ** SORT BY T17H **

                                               WCODE=F003

                                               UNIVARIATE

VARIABLE=VOLUME
WEIGHT  =IWGHT           WEIGHT

                MOMENTS                                       QUANTILES(DEF=4)                          EXTREMES

N                2  SUM WGTS      3.1039        100% MAX     531463     99%     531463        LOWEST   HIGHEST
MEAN        236332  SUM           733551         75% Q3      531463     95%     531463          2195         .
STD DEV     463123  VARIANCE   2.145E+11         50% MED     266829     90%     531463        531463         .
SKEWNESS         .  KURTOSIS           .         25% Q1        2195     10%       2195             .         .
USS      3.878E+11  CSS        2.145E+11          0% MIN       2195      5%       2195             .      2195
CV         195.963  STD MEAN      327477                                  1%       2195             .    531463
T:MEAN=0  0.721674  PROB>|T|    0.602033        RANGE        529268
SGN RANK       1.5  PROB>|S|    0.371093        Q3-Q1        529268
NUM ^= 0         2                              MODE           2195
```

Table 2-1a Summary of Solvent Wastes Disposed of in Waste Piles

(million gallons per year)

Waste description	Volume
Organic liquids:	
halogenated	0.009
nonhalogenated	0.004
Total	0.013
Organic sludges:	
halogenated	0
nonhalogenated	0.730
Total	0.730
TOTAL:	
halogenated	0.009
nonhalogenated	0.734
Total	0.743

Table 2-1b Summary of Wastes Disposed of in Waste Piles

Waste description	Facility ID	Waste code	D-field	Volume (gal)
Organic liquids: halogenated	PAD990825408	F001	401	9,317
Organic liquids: nonhalogenated	IND081523284	F003	408	3,799
Organic sludges/solids: nonhalogenated	IAD005272398	F003	502	729,752

2042s

Table 2-2a Summary of Solvent Wastes Landfilled

(million gallons per year)

Waste description	Volume
Organic liquids:	
halogenated	11.276
nonhalogenated	12.813
Total	24.089
Organic sludges:	
halogenated	2.383
nonhalogenated	2.673
Total	5.056
Inorganic sludges:	
Halogenated	15.213
nonhalogenated	0.103
Total	15.316
Inorganic solids:	
halogenated	0
nonhalogenated	0.275
Total	0.275
Total:	
halogenated	28.872
nonnalgenated	15.864
Total	44.736

Table 2-2b Summary of Solvent Wastes Landfilled

Waste description	Facility ID	Waste code	D-field	Volume (gal)
Inorganic solids: nonhalogenated	PRD090028101	X042	100	275,466
Inorganic sludges: halogenated	NJD002385730	X067	202	15,212,765
Inorganic sludges: nonhalogenated	CAD041835695	F003	206	103,041
Organic liquids: halogenated	XXX999999111	F001	400	7,762
	CAD000060012	X113	401	4,711,704
	XXX999999003	F001	401	789,983
	XXX999999128	F002	401	164,352
	XXX999999047	F002	401	49,760
	XXX999999048	F001	401	8,068
	XXX999999031	F002	401	2,464
	NMD890010515	F001	401	296
	MID048090633	F002	400	5,541,237
Total				11,275,626
Organic liquids: nonhalogenated	MID000810408	X002	401	1,453,050
	ALD000622464	F003	401	1,339,710
	XXX999999128	F003	401	412,028
	XXX999999047	F003	401	276,733
	XXX999999047	F005	401	27,062
	XXX999999031	F005	401	2,190
	COT090011529	F003	401	51
	MID048090633	F005	400	9,301,747
Total				12,812,571
Organic sludges/solids: halogenated	TXD000838896	F001	500	1,559,346
	MID000810408	X022	500	823,531
Total				2,382,877
Organic sludges/solids: nonhalogenated	ORD009036716	F005	500	5,891
	KSD070902952	X002	505	50,243
	MID000810408	X021	500	2,010,975
	IND050530872	F005	502	605,725
Total				2,672,834

2042s

Table 2-3a Summary of Solvent Wastes Stored in Surface Impoundments

(million gallons per year)

Waste description	Volume
Organic liquids:	
halogenated	77.782
nonhalogenated	1.195
Total	78.977
Organic sludges:	
halogenated	45.062
nonhalogenated	0.019
Total	45.081
Inorganic sludges:	
halogenated	12.439
nonhalogenated	0
Total	12.439
Solvent-water mixtures:	
halogenated	171.321
nonhalogenated	0
Total	171.321
Unknown:	
halogenated	0
nonhalogenated	1.345
Total	1.345
Total:	
halogenated	306.604
nonhalgenated	2.559
Total	309.163

Table 2-3b Summary of Wastes Stored in Surface Impoundments

Waste description	Facility ID	Waste code	D-field	Volume (gal)
Unknown:				
halogenated	MID096963194	F003	0	1,344,600
Inorganic sludges/solids:				
nonhalogenated	NJD011136884	F003	203	12,438,802
Solvent-water mixtures:				
halogenated	TXD078432457	F001	301	171,098,799
	CAD001705235	F002	301	221,787
Total				171,320,586
Organic liquids:				
halogenated	XXX999999103	F002	400	77,339,500
	CAD000030494	F002	401	443,115
Total				77,782,615
Organic liquids:				
nonhalogenated	MID096963194	F005	401	1,195,200
	TXD066447376	F003	401	34
	TXD066447376	F005	401	11
Total				1,195,245
Organic sludges/solids:				
halogenated	MSD007037278	F002	502	45,062,385
Organic sludges/solids:				
nonhalogenated	NJD011136884	F003	502	18,782

Table 2-4a Summary of Solvent Wastes Treated in Surface Impoundments

(million gallons per year)

Waste description	Volume
Organic liquids:	
halogenated	0
nonhalogenated	0.257
Total	0.257
Organic sludges:	
halogenated	0
nonhalogenated	0.071
Total	0.071
Solvent-water mixtures:	
halogenated	187.495
nonhalogenated	200.876
Total	388.371
Total:	
halogenated	187.495
nonnalgenated	201.204
Total	388.699

Table 2-4b Summary of Wastes Treated in Surface Impoundments

Waste description	Facility ID	Waste code	D-field	Volume (gal)
Solvent-water mixtures:				
halogenated	LAD043426006	F001	301	184,914,070
	IND050530872	X018	301	2,580,668
Total				187,494,738
Solvent-water mixtures:				
nonhalogenated	VAD003122165	F003	301	28,280,168
	XXX999999002	F003	301	172,595,789
Total				200,875,957
Organic liquids:				
nonhalogenated	XXX999999110	X002	400	27,076
	XXX999999110	F005	400	135,217
	XXX999999080	F003	400	94,549
Total				256,842
Organic sludges/solids:				
nonhalogenated	ILD005215769	F005	502	43,452
	ILD005215769	F003	502	27,651
Total				71,103

Table 2-5a Summary of Solvent Wastes Treated in and Stored in Surface Impoundments

(million gallons per year)

Waste description	Volume
Organic liquids:	
halogenated	0.172
nonhalogenated	0.023
Total	0.195
Organic sludges:	
halogenated	3.982
nonhalogenated	0.243
Total	4.225
Solvent-water mixtures:	
halogenated	1,644.352
nonhalogenated	447.945
Total	2,092.297
Total:	
halogenated	1,648.506
nonhalgenated	448.211
Total	2,096.717

Table 2-5b Summary of Wastes Treated and Stored in Surface Impoundments

Waste description	Facility ID	Waste code	D-field	Volume (gal)
Solvent-water mixtures:				
halogenated	SC0048373468	X173	301	1,644,351,582
Solvent-water mixtures:				
nonhalogenated	TXD008079212	F005	301	445,336,634
	TXD008079212	F005	306	2,608,400
Total				447,945,034
Organic liquids:				
halogenated	PAD004397683	F002	400	89,051
	PAD004397683	F001	400	45,020
	TX6213820529	F001	400	29,303
	TX6213820529	F002	400	1,686
	PAD082434747	F001	401	7,354
Total				172,414
Organic liquids				
nonhalogenated	PAD082434747	F005	400	15,183
	PAD082434747	X038	400	5,267
	TX6213820529	F003	400	1,679
	TX6213820529	F005	400	1,351
Total				23,480
Organic sludges/solids:				
halogenated	OH0020273819	F001	530	486,867
	OH0020273819	F002	502	3,495,442
Total				3,982,309
Organic sludges/solids:				
nonhalogenated	MID002931228	F005	502	33,633
	OH0020273819	F003	502	209,283
Total				242,916

Table 2-6a Summary of Solvent Wastes Disposed of in Surface Impoundments

(million gallons per year)

Waste description	Volume
Organic liquids:	
halogenated	0.822
nonhalogenated	1.813
Total	2.635
Inorganic sludges:	
halogenated	6.144
nonhalogenated	0
Total	6.144
Total:	
halogenated	6.966
nonhalgenated	1.813
Total	8.779

ATTACHMENT 3

HALOGENATED AND NONHALOGENATED SOLVENT
MIXED WASTE STREAMS
("X" WASTE CODES)

Table 3-1 Mixed Halogenated Solvent "X" Waste Codes[*]

X001 - F001, F002
X003 - D001, F002, F003, F005
X004 - F001, F003
X016 - D001, F001, F002
X018 - F002, F003, F005
X022 - F001, F002, F003, F005, F006, F007, F008, F009, F010, F011, F017
X033 - F001, F002, F003, F005
X058 - F002, F003
X064 - F002, F004
X067 - F002, F003, F005, F006, F007, K050, K051, K052
X078 - F005, D004, D002, U044, U220
X088 - F001, U226, U227, U228
X095 - F002, F005
X104 - F001, F002, F003, F005
X108 - F001 and mixed lube oils (nos)
X113 - F001, F005
X123 - D001, D006, F002, F003, F005
X139 - F001, F003, F005
X148 - D001, D002, F001, F002, F003, F005
X150 - F001, U226
X161 - F002, U210, U211
X173 - D002, D007, F002, F003, F004, U188
X178 - F002, D002
X179 - F002, F003, F005
X194 - D006, D008, F001

---

[*] X codes refer to the codes assigned to waste streams reported to contain a mixture of waste codes. A halogenated solvent waste designation was given to any X code containing F001 or F002.

Table 3-2 Mixed Nonhalogenated Solvent "X" Waste Codes[*]

X002 - F003, F005
X008 - F003, F005, F017
X013 - D001, F003, F005
X021 - F003, F006, F008, F009, F010, F017, K063, U239, P001
X038 - F005, U159
X042 - D003, F005
X048 - F003, F005, D001, D006, D007, D008
X057 - U002, F003, D001
X071 - D001, F005
X079 - U220, F003
X089 - F005, U220, U229
X090 - F003, U002, U117, U154, U161, U239
X096 - F003, F005, F006
X099 - F003, F005, K086
X100 - F003, F005, U239, U220, U112, U161, U159, U002, U019, U154
X103 - F003, F005
X112 - F002, F005, K078, K079
X121 - U112, F003
X127 - D001, F003
X169 - U154, F005, D003
X175 - D001, D003, D005, D006, D007, D008, D009, F003, F005, K078, K081
X185 - F003, D001, D007, D008
X186 - F003, D001, D002

---

[*] X codes refer to the codes assigned to waste streams reported to contain a mixture of waste codes. A nonhalogenated solvent waste designation was given to any X code containing F003, F004, or F005, that did not contain F001 or F002.

APPENDIX B

Other Capacity Requirements

a. Small Quantity Generator Wastes
b. CERCLA Wastes
c. RCRA Corrective Action Wastes

APPENDIX B

Other Capacity Requirements

a. Small Quantity Generator Wastes

To fully evaluate treatment and recycling capacity requirements, consideration must be given not only to the wastes that will be affected by the land disposal restrictions, but also to other wastes that will compete for alternative capacity with the solvent wastes restricted from land disposal. This will include those wastes generated by what are known as Small Quantity Generators (SQGs), for which new requirements are proposed (see 50 FR 31278).

Prior to the Hazardous and Solid Waste Amendments (HSWAs) of 1984, wastes generated by SQGs were not subject to most RCRA requirements. The amendments, however, now require that certain SQGs manage their wastes as hazardous where appropriate. The final regulations pertaining to these SQGs will result in an additional demand for alternative capacity which must be accounted for here. The quantity of solvent wastes estimated to be land disposed by small quantity generators in today's rule, 8.7 million gallons per year, has increased from that estimated in the proposed rule, 7.8 million gallons. The volume of waste generated by SQGs predicted to require treatment and recycling as a result of the HSWAs was derived from the National Small Quantity Generators Survey, conducted for the U.S. EPA (Ref. 5).

The 8.7 million gallons of SQG solvent wastes were assumed to be organic liquids and sludges (non-solids) based on the reported descriptions of the wastes (Ref. 5). For the purpose of estimating capacity needs for these wastes, the volume was distributed between the three alternative treatment and/or recycling technologies identified in Section C of this document as applicable for spent solvents, organic liquids, still bottoms, or organic sludges. These technologies are distillation, fuel substitution, and incineration.

The distribution of the SQG solvent waste volume between the technologies was based on the ratio of the proportions of the solvent wastes currently land disposed annually. From Table C-3, 3.4 million gallons were estimated to be directed to distillation, 15.3 million gallons to fuel substitution, and 19.0 million gallons to liquid incineration, for a total volume of 37.7 million gallons annually (RIA Maily Survey data). The estimates for the SQG solvent wastes based on the same proportions are as follows:

Technology	Ratio*	Required capacity (million gallons per year)
Distillation	3.4/37.7	0.8
Fuel substitution	15.3/37.7	3.5
Incineration	19.0/37.7	4.4
		8.7

---

* Ratio of the proportion of the volume directed to that technology to the total volume directed to all three technologies.

b. CERCLA Wastes

Wastes resulting from the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) result in additional competition with solvent wastes and other RCRA wastes for alternative capacity. The proposed rule contained no quantity estimates for solvent wastes anticipated to result from removal and/or remedial actions taken by the Agency under CERCLA. For today's rule, it has been estimated that 4.1 million gallons per year of solvent-containing sludge and solid waste to be land disposed will be generated as a result of CERCLA remedial actions (refer to Appendix C for a more complete analysis of CERCLA waste volumes). These wastes, if affected by the land disposal restrictions, will represent additional capacity demand for commercial incineration.

c. RCRA Correction Action Wastes

Wastes from corrective actions under Subtitle C of RCRA result in additional wastes requiring alternative treatment capacity. For today's rule, it has been estimated that 16.1 million gallons per year of solvent-containing wastes will be generated as a result of RCRA corrective action procedures (refer to Appendix D). These wastes will be affected by the land disposal restrictions, and will require alternative treatment capacity. The Agency is assuming that these wastes will be directed to commercial incineration.

APPENDIX C

Waste Volumes Analysis for Superfund (CERCLA)

Submitted to:

Office of Solid Waste
U.S. Environmental Protection Agency
401 M Street, S.W.
Washington, D.C. 20460

Submitted by:

Office of Emergency and Remedial Response
Hazard Response Support Division
U.S. Environmental Protection Agency
401 M Street, S.W.
Washington, D.C. 20460

WASTE VOLUMES ANALYSIS FOR SUPERFUND

Introduction

To determine if the alternative treatment and recycling capacity of commercial facilities is adequate to manage solvent wastes restricted from land disposal, EPA must recognize the demand that wastes generated in cleanup of hazardous waste sites and chemical spills places on this capacity. These cleanups take place principally under the authority of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), Public Law 96-510, enacted December 1980. This law is often referred to as Superfund. Other cleanup actions may be undertaken by States under State statutes, or by private parties.

Superfund cleanup actions fall under two categories:

- Removal actions are short term actions taken to control an immediate or imminent hazardous release
- Remedial response actions are long-term actions intended to stop or substantially reduce releases or threats of releases of hazardous substances that are serious, but not immediately life-threatening. Remedial actions have two main phases: the remedial investigation (RI) and feasibility study (FS), in which site contamination is characterized and alternative methods to clean up the site are evaluated; and the remedial design and action stage, in which the recommended cleanup alternative is designed and undertaken. The recommended response, and the rationale for choosing it, are documented in the Record of Decision (ROD).

Remedial actions delegated to the States are called State-lead actions or sites. Superfund remedial response actions also may be undertaken by "potentially responsible parties" (PRPs), private parties whom EPA identifies as those potentially responsible for causing the contamination problem. Cleanups involving PRPs are referred to as enforcement-lead sites.

Scope of Analysis

Because of the lack of data available for the wastes generated by other than Superfund cleanups (e.g., State-sponsored or private actions), the volumes analysis given here is limited to wastes generated under Superfund. Wastes that may result from corrective action under Subtitle C of RCRA are also not included. The Superfund actions analyzed include removal and all types of remedial actions (Federal-, State-, and enforcement-lead).

The purpose of the EPA capacity analysis is to predict if alternative capacity will be available should all wastes subject to this rulemaking be restricted from land disposal in November,

1986. Thus this Superfund waste volumes analysis gives estimates of pertinent waste that will be generated in the next year, or approximately between November, 1987, and November, 1988. This estimate represents wastes generated annually by the Superfund program.

The Hazardous and Solid Waste Amendments (HSWA) of 1984 waive the effective date of the land disposal restrictions for CERCLA solvent and dioxin waste that is soils and debris (HSWA §3004(d) and (e)). This waste becomes subject to the restrictions in November, 1988. Therefore, the quantity of Superfund soils and debris generated annually is not germane to the analysis given here, and has not been evaluated.

The January, 1986 proposed rulemaking defined best demonstrated available technology (BDAT) for dioxin-contaminated waste as thermal destruction. The proposal also gave a two-year variance from the land disposal restrictions for this waste based on the fact that no incinerators had been authorized to accept dioxin waste, and thus no alternative capacity was available. At the time of this analysis, there are still no such authorized facilities. Because the volume of Superfund-generated dioxin waste does not bear on the decision that capacity for these wastes is inadequate,[1] this analysis does not include an estimate of dioxin wastes generated annually by the CERCLA program.

Superfund Demand for Alternative Capacity

Future CERCLA demand on alternative capacity may originate in two ways:

- Waste that is destined for off-site RCRA treatment or recycling facilities will compete with industry-generated waste (RCRA waste) for treatment/recycling capacity. This CERCLA waste may or may not contain solvents. (EPA assumes that planned on-site actions involving alternatives to land disposal would not compete for RCRA capacity.)
- The land disposal restrictions for solvents will require that Superfund waste subject to these restrictions be treated prior to off-site land disposal. Therefore, Superfund waste that contains solvents (and that is not otherwise waived from the restrictions) will compete with RCRA waste for alternative capacity.

Sources of Data

EPA's Office of Emergency and Remedial Response (OERR) is in the process of developing a database containing information on remedial action sites. The data include waste characterization (e.g., matrix, constituents and concentrations, source, volume), and alternatives considered and chosen for site clean up. The data are obtained from a review of RIs, FSs, RODs, enforcement decision documents (EDDs), and other pertinent site documentation. Phase I of this project is in process, and includes RODs and EDDs signed through the second quarter of FY86 (approximately 120 RODs and four EDDs). These data were used as a screen in order to determine which sites are planning (1) off-site incineration, and (2) land disposal of solvent-contaminated sludges and solids. The data were then verified in telephone interviews with Regional remedial Superfund staff.

OERR has also developed a database of information concerning removal actions that occurred in fiscal year 1984 (FY84). This database is the only complete compilation of annual data for removal actions. Fiscal year 1984 was assumed as representative of current removal program practices. This database contains waste characterization, management, and cost data for 140 removal actions and 434 wastes. Data were obtained from removal site files and Regional staff. Information sources included documents such as action memoranda, site "fact sheets," and Pollution Reports (POLREPs). Regional staff provided substantial new information, and verified data from EPA Headquarters sources.

Unlike longer term remedial response actions, removal actions, often take place within a year of discovering the contamination. The numbers and types of removal actions cannot, therefore, be precisely projected. For the purposes of this analysis, it was assumed that the quantities and types of removal wastes handled in FY84 are the same as those that will be managed in the upcoming year. A comparison of FY84 and FY85 removal action data shows a similar distribution in the types of hazardous substances receiving emergency cleanup. Also, an informal survey of four Regions conducted by OERR indicates that the incidence of solvent waste may actually be increasing, but this increase cannot be quantified.

Calculations of Waste Volumes

The methodology and results of the volumes analysis are given below. As noted above, because of the difference in the data available for remedial and removal actions, the analysis of waste volumes generated by these actions also differs. Although volumes of sludges and solids are often reported in cubic yards or by weight, all quantities have been converted to gallons in order to be consistent with the analysis of RCRA wastes and of capacity.

Removal Actions

As discussed above, the data for FY84 removal actions were evaluated in order to project annual CERCLA waste volumes that would compete with RCRA waste for alternative capacity. The alternatives to land disposal used for removal waste include: incineration, recycling, carbon filtration, air stripping, neutralization, fuels blending, and oxidation of cyanides. For instance, the volume of removal wastes incinerated in FY84 was 6.6 million pounds or 91,000 gallons.

Based on the assumption that FY84 was a representative year for removal actions, it is assumed that in the next year, the demand generated by removal actions for such alternative treatment will remain constant with one exception: removal wastes (excluding soils and debris that contain solvents and that were land disposed in FY84, will require alternative capacity if the land disposal restrictions are effective for this waste in November 1986.

According to the database, in FY84 12 removal action sites resulted in off-site land disposal of sludge and solid waste containing at least one of the solvents covered by this rulemaking. Information on these 12 sites is given in Attachment 1. The total volume of this removal waste was 17,200,000 pounds or 2,060,000 gallons. Although a few sites landfilled solvent-contaminated liquids in FY84, most liquids are no longer landfilled, and are already being sent to alternative treatment/recycling facilities. Therefore, these liquids would not exert an increase in demand for alternative capacity in the next year, and are not included in this analysis.

According to the data given in Attachment 1, at least nine of the 12 solvent wastes are "solvents," or "flammable liquids/ solvents" or "solvents mixed with other types of hazardous substances." Without further analysis of waste sources, EPA cannot determine if these wastes were actually spent solvents that would fall under F001, F002, F003, F004, or F005 waste codes. Therefore, for the purpose of this analysis, EPA is assuming conservatively that all of the solvent wastes are spent solvents and would be subject to the land disposal restrictions.

Furthermore, little concentration data are available for these 12 wastes. Two wastes included concentration information on specific restricted solvents. Two wastes reportedly contained high concentrations of some contaminants, although not necessarily restricted solvents (see Attachment 1). The concentration of contaminants in the other eight streams was not described in the data sources. Typically, removal action waste is significantly concentrated, since removal actions take place to alleviate substantial, and often immediate, hazards. In this analysis, EPA assumes that all of the waste identified by the removal database would contain at least one solvent that exceeds the promulgated restriction levels.

In summary, the total volume of solvent waste generated by Superfund removal actions projected to require alternative capacity in the next year is estimated to be 2,060,000 gallons. These wastes are sludges and solids, and are assumed to be spent solvents containing concentrations of solvents that exceed promulgated land disposal restriction levels.

Remedial Action Wastes

Unlike removal actions, remedial response actions entail a more detailed evaluation of cleanup alternatives and a more time-consuming implementation of the clean up. The waste at the site is generally better characterized, and the recommended alternative is documented in the ROD prior to implementation. Therefore, this volumes analysis was able to incorporate a site-by-site evaluation of waste volumes of interest to be managed in the next year.

As described earlier, Superfund waste will exert a demand on RCRA alternative capacity in two ways. Some remedial actions that are already planned for the next year will require off-site alternative treatment/recycling. In addition, off-site landfilling of solvent waste is planned for some sites in the next year. In order to comply with the land disposal restrictions, this waste may need to be redirected to an off-site treatment/recycling facility to comply with the land disposal restrictions.

Planned Alternatives. In the next year, incineration is the alternative chosen for the majority of Superfund actions that plan to send waste off-site to a RCRA treatment or recycling facility. Based on the remedial action database and discussions with Regional staff, EPA currently plans to send waste from seven sites to off-site incinerators in the next year. These sites, and corresponding waste volumes, are given in Table 1. The table also gives a brief description of the waste. More information on waste characteristics is available in the RIs, FSs, and the RODs for each site. The total volume of waste to be incinerated in the next year is estimated to be 5,580,000 gallons. The plans to incinerate this remedial waste are subject to change, and the estimate of remedial waste to be incinerated is made solely for the purpose of this volumes analysis.

In order to determine the increase in demand for incineration capacity, the current demand (or baseline) must be calculated and subtracted from the total future demand. A few past remedial actions have sent waste to off-site incinerators. These sites, and the waste volumes incinerated, are listed in Table 2. The waste volume incinerated most recently, 162,000 gallons in 1986, is chosen as the current demand by remedial action sites for incineration capacity. Because the 1,000,000 gallons of waste incinerated in 1984 was sent to an incinerator in Canada, EPA does not believe that this volume accurately represents the annual demand for national incinerator capacity.

Thus the net increase in demand on incinerator capacity generated by the Superfund remedial action program is calculated to be 5,580,000 gallons minus 162,000 gallons, or 5,420,000 gallons.

TABLE 1

CERCLA WASTE VOLUMES: WASTES PRESENT AT REMEDIAL ACTION SITES AND FOR WHICH OFF-SITE INCINERATION IS PROJECTED BETWEEN NOVEMBER 1986 AND NOVEMBER 1987

EPA Region	Site Name, State	Date ROD signed	Waste Description	Estimated Volume[1]
02	Bridgeport, NJ	12/31/84	Liquids containing PCBs, chlorinated hydrocarbons	766,000 gal
	Swope Oil, NJ	09/27/85	Liquids containing organics	17,000 gal
			Solids containing organics and metals	4,200 gal
			Soils containing >500 ppm PCBs	38,300 gal
	Bog Creek, NJ	09/30/85	Soil containing volatile organics	1,320,000 gal[2]
			Sediments containing volatile organics	650,000 gal[2]
			Sludges containing solvents and metals	485,000 gal
03	Lackawanna Refuse, PA	03/22/85	Liquids, solvents Pb, Cr	200,000 gal
	Laskin/Poplar, OH	RI/FS[3]	Sludge containing organics	800,000 gal
	Acme Solvents, IL	09/27/85	Sludges, solids containing solvents, PCBs	1,250,000 gal[2]
08	Woodbury Chemical, CO	07/19/85	Rubble and soil containing pesticides	50,500 gal
			TOTAL	5,581,000 gal

---

[1] Conversion factors: 8.34 lb/gal; 2,200 lb/cubic yard; 2,200 lb/metric ton

[2] One-half of total waste volume; second half projected to be incinerated in FY88

[3] Remedial Investigation (RI)/Feasability Study (FS) drafted.

ROD = Record of Decision

Sources: RI/FS reports, RODs, conversations with EPA Regional staff

TABLE 2

CERCLA WASTE VOLUMES: WASTES FROM REMEDIAL ACTION SITES SENT TO OFF-SITE INCINERATORS IN THE PAST

EPA Region	Site Name, State (Date ROD Signed)	Date Action Occurred	Waste Description	Volume[1]
05	Berlin & Farro, MI (02/29/84)	1984[2]	Liquids containing solvents, metals	1,000,000 gal
10	Western Processing, WA (08/05/84)	1985	Liquids, sludges containing organics, metals	110,000 gal
05	Laskin/Poplar, OH (08/09/84-IRM)	February 1986	Oily liquids containing PCBs, Pb	162,000 gal

---

[1] Conversion factors: 8.34 lb/gal; 2,200 lb/cubic yard; 2,200 lb/metric ton

[2] Waste sent to incinerator in Canada

ROD = Record of Decision, IRM = Interim Response Measure

Sources: RI/FS reports, RODs, conversations with EPA Regional staff

Planned Land Disposal. Off-site land disposal of solvent-containing sludge and solid waste from several remedial action sites is planned for the next year. As with removal wastes containing solvents, EPA cannot determine which of these wastes are actually spent solvent waste subject to this rulemaking. Based on the waste sampling data contained in the remedial action database (see Attachment 2), most of these wastes contain at least one solvent in concentrations that exceed the promulgated restriction levels. Solely for the purpose of this analysis, all of this waste is assumed to require alternative capacity if the land disposal restrictions go into effect for this waste in November 1986.

Table 3 lists the remedial action sites and the volume of solvent-containing sludge and solid waste to be land disposed in the next year from each site. The total volume of such waste is 4,140,000 gallons.

Conclusions

In the future, CERCLA waste will complete with RCRA waste for available hazardous waste treatment capacity. In the next year, 5,420,000 gallons of organic-contaminated Superfund waste will be sent to off-site commercial incinerators. In addition, EPA is currently planning in the next year to land dispose off-site 2,060,000 gallons of solvent-containing sludges and solids from removal actions, and 4,140,000 gallons of solvent-contaminated sludges and solids from remedial actions. Should the land disposal restrictions for solvents be effective for these wastes in November, 1986, EPA would be prohibited from disposing of these wastes in off-site landfills, and would require alternative capacity.

The likely treatment alternative for sludges and solids containing solvents is incineration, which EPA has determined to be BDAT. Therefore, the 2,060,000 gallons plus 4,140,000 gallons or 6,200,000 gallons of CERCLA solvent waste would probably compete for incineration capacity if restricted from land disposal.

TABLE 3

CERCLA WASTE VOLUMES: SOLVENT-CONTAINING SLUDGES AND SOLIDS PRESENT AT REMEDIAL ACTION SITES AND PROJECTED TO BE LANDFILLED BETWEEN NOVEMBER 1986 AND NOVEMBER 1987

EPA Region	Site Name, State	Date ROD Signed	Waste Description	Volume*
02	Burnt Fly Bog, NJ	11/16/83	Sludges	2,400,000 gal (12,046cy)
	Swope Oil, NJ	9/27/85	Sludges	277,700 gal (1,375cy)
05	Cemetery Dump, MI	9/11/85	Solids	344,000 gal (1,703cy)
	Bayou Bonfouca, LA	8/15/85	Solids	1,010,000 gal (5,000cy)
10	Western Processing, WA	9/25/85	Solids	107,500 gal (536cy)
			TOTAL	4,139,200 gal (20,660cy)

---

* Conversion factors: 7.481 gal/cubic foot(cf); 27 cf/cubic yard(cy)

ROD = Record of Decision

Sources: Remedial Investigation (RI)/Feasability Study (FS) Reports, RODs, and conversations with EPA Regional staff

TABLE 4

SUMMARY OF SOLVENT WASTE THAT WILL BE GENERATED BY THE CERCLA PROGRAM BETWEEN NOVEMBER 1987 AND NOVEMBER 1988

Source	Volume
Net increase in planned off-site incineration of remedial waste	5,420,000 gallons
Planned land disposal of remedial waste	4,140,000 gallons
Projected land disposal of removal waste (based on FY84 removals)	2,060,000 gallons

ATTACHMENT 1

10/10/86 LDR Historical Database Page: 1
Data Collection Form

Site Data:

EPA Region : 3
Site ID# : B2
Site name : Kane and Lombard Streets
Site location : Baltimore
State : MD
Start date : 05/08/84
Finish date : 06/08/84
Length : 32 Days
Total cost : $521,571
NPL Rank : GR 11
Date on NPL : 10/15/84
Type of action: Removal/stabilization
On or off site: Off
OSC Report : Yes
OSC : Robert Caron
Comments :

Waste Information: Page: 2

Site ID# : B2 Region : 3 Name: Kane and Lombard Streets

Waste Characterization:
Substance : Solvents, organics, heavy metals
Amount : 54 drums Amount in lbs : 24,770
Concentration : High, see comments
Waste category : Solvents,Calif-metal
Waste matrix : Solid

Waste Disposition
Type of treatment/disposal : Landfill
Destination : Fondessy Enterprises
Facility location : Oregon State : OH
Distance in miles : 470

Costs of Waste Disposal
Laboratory/Analysis cost :
Hazardous substance transportation cost :
Non-hazardous substance transportation cost :
Hazardous substance disposal cost :
Non-hazardous substance disposal cost :
Comments : EthylB 2800ppm, Toluene 25.5%, Cr 1100ppm, Pb 6000 ppm, PNA 250

10/10/86

LDR Historical Database
Data Collection Form

Site Data:

EPA Region : 3
Site ID# : 70
Site name : Middletown Road
Site location : Annapolis
State : MD
Start date : 06/23/83
Finish date : 12/23/83
Length : 184 Days
Total cost : $445,129
NPL Rank : 520
Date on NPL : 12/15/82
Type of action: Removal
On or off site: Off
OSC Report : Yes
OSC : Tom Massey, Jeff Pike
Comments :

Waste Information:

Site ID# : 70 Region : 3 Name: Middletown Road

Waste Characterization:
Substance : Lead and organic solvent
Amount : 62 drums Amount in lbs : 28,439
Concentration : High
Waste category : Solvents,Calif-metal
Waste matrix : Sludge

Waste Disposition
Type of treatment/disposal : Landfill
Destination : Delaware Container Corp.
Facility location : Coatesville State : PA
Distance in miles : 120

Costs of Waste Disposal
Laboratory/Analysis cost :
Hazardous substance transportation cost : 5,500.00
Non-hazardous substance transportation cost :
Hazardous substance disposal cost : 28,257.00
Non-hazardous substance disposal cost :
Comments : Transport/disposal costs are total for all four waste streams.

10/10/86 LDR Historical Database Page: 1
Data Collection Form

Site Data:

EPA Region : 3
Site ID# : 75
Site name : Wheeling Hill
Site location : Wheeling
State : WV
Start date : 09/15/83
Finish date : 12/28/83
Length : 105 Days
Total cost : $4,372
NPL Rank : No
Date on NPL : / /
Type of action: Removal
On or off site: Off
OSC Report : Yes
OSC : Benton Wilmoth
Comments :

Waste Information: Page: 2

Site ID# : 75 Region : 3 Name: Wheeling Hill

Waste Characterization:
Substance : Paint solvents
Amount : 10 drums Amount in lbs : 4,587
Concentration : Unknown
Waste category : Solvents
Waste matrix : Solid

Waste Disposition
Type of treatment/disposal : Landfill
Destination : Chemical Waste Management
Facility location : Emelle State : AL
Distance in miles : 870

Costs of Waste Disposal No cost data.
Laboratory/Analysis cost : 201.00
Hazardous substance transportation cost : 330.00
Non-hazardous substance transportation cost :
Hazardous substance disposal cost : 273.00
Non-hazardous substance disposal cost :
Comments :

10/10/86

LDR Historical Database
Data Collection Form

Page: 1

Site Data:

EPA Region : 4
Site ID# : A9
Site name : Johnson Property
Site location : Stockbridge
State : GA
Start date : 04/09/84
Finish date : 04/16/84
Length : 8 Days
Total cost : $47,334
NPL Rank : No
Date on NPL : / /
Type of action: Removal
On or off site: Off
OSC Report : No
OSC : Shane Hitchcock
Comments : Information obtained from Action Memo.

Waste Information:

Page: 2

Site ID# : A9 Region : 4 Name: Johnson Property

Waste Characterization:
Substance : Hazardous waste solids: lead, paint waste, solvent
Amount : 424,900 lbs Amount in lbs : 424,900
Concentration : Unknown
Waste category : Metals, solvents
Waste matrix : Solid

Waste Disposition
Type of treatment/disposal : Landfill
Destination : SCA Services
Facility location : Pinewood State : SC
Distance in miles : 250

Costs of Waste Disposal Est. from Action Memo
Laboratory/Analysis cost :
Hazardous substance transportation cost : 10,000.00
Non-hazardous substance transportation cost :
Hazardous substance disposal cost :
Non-hazardous substance disposal cost :
Comments : Estimate for transport and disposal.

10/10/86 LDR Historical Database Page: 1

Data Collection Form

Site Data:

EPA Region : 4
Site ID# : C4
Site name : Potters Pits
Site location : Maco
State : NC
Start date : 03/15/84
Finish date : 04/05/84
Length : 22 Days
Total cost : $240,671
NPL Rank : No
Date on NPL : / /
Type of action: Removal
On or off site: Off
OSC Report : No
OSC : Sue Fields
Comments : Information obtained from Action Memo and polreps.

Waste Information: Page: 2

Site ID# : C4 Region : 4 Name: Potters Pits

Waste Characterization:
Substance : Hazardous waste solids: solvents and creosote
Amount : 3,520,000 lbs Amount in lbs : 3,520,000
Concentration : Unknown
Waste category : Solvents
Waste matrix : Solid

Waste Disposition
Type of treatment/disposal : Landfill
Destination : SCA Services
Facility location : Pinewood State : SC
Distance in miles : 150

Costs of Waste Disposal
Laboratory/Analysis cost :
Hazardous substance transportation cost :
Non-hazardous substance transportation cost :
Hazardous substance disposal cost :
Non-hazardous substance disposal cost :
Comments :

10/10/86 LDR Historical Database Page: 1
Data Collection Form

Site Data:

EPA Region : 4
Site ID# : 99
Site name : Rock Bridge Park
Site location : DeKalb County
State : GA
Start date : 01/03/84
Finish date : 01/25/84
Length : 21 Days
Total cost : $21,617
NPL Rank : No
Date on NPL : / /
Type of action: Removal
On or off site: Off
OSC Report : No
OSC : Jan Rogers
Comments : Information obtained from Action Memo and 3 polreps.

Waste Information: Page: 2

Site ID# : 99 Region : 4 Name: Rock Bridge Park

Waste Characterization:
Substance : Solvents: xylene, phenol
Amount : 60 cu yd Amount in lbs : 132,000
Concentration : Unknown
Waste category : Solvents
Waste matrix : Solid

Waste Disposition
Type of treatment/disposal : Landfill
Destination : Chemical Waste Management
Facility location : Emelle State : AL
Distance in miles : 260

Costs of Waste Disposal Est. from Action Memo
Laboratory/Analysis cost : 1,000.00
Hazardous substance transportation cost :
Non-hazardous substance transportation cost : 4,400.00
Hazardous substance disposal cost :
Non-hazardous substance disposal cost :
Comments : Estimate for transport includes disposal.

10/10/86 LDR Historical Database Page: 1
Data Collection Form

Site Data:

EPA Region : 4
Site ID# : 95
Site name : Roosevelt Highway Spill
Site location : College Park
State : GA
Start date : 12/08/83
Finish date : 12/15/83
Length : 8 Days
Total cost : $34,937
NPL Rank : No
Date on NPL : / /
Type of action: Removal
On or off site: Off
OSC Report : Yes
OSC : Ed Hatcher
Comments :

Waste Information: Page: 2

Site ID# : 95 Region : 4 Name: Roosevelt Highway Spill

Waste Characterization:
Substance : Hazardous waste solids-solvents:xylene,butanol,MEK
Amount : 144 cu yd Amount in lbs : 316,800
Concentration : Unknown
Waste category : Solvents
Waste matrix : Solid

Waste Disposition
Type of treatment/disposal : Landfill
Destination : Chemical Waste Management
Facility location : Emelle State : AL
Distance in miles : 250

Costs of Waste Disposal
Laboratory/Analysis cost :
Hazardous substance transportation cost :
Non-hazardous substance transportation cost :
Hazardous substance disposal cost :
Non-hazardous substance disposal cost :
Comments : Files say 246 drums labeled dioxin or flammable. Wastes are sc

10/10/86

LDR Historical Database
Data Collection Form

Site Data:

EPA Region : 4
Site ID# : C7
Site name : Whitley County
Site location : Silar
State : KY
Start date : 04/30/84
Finish date : 05/18/84
Length : 19 Days
Total cost : $75,140
NPL Rank : No
Date on NPL : / /
Type of action: Removal
On or off site: Off
OSC Report : No
OSC : Warren Dixon
Comments : Polreps only.

Waste Information:

Site ID# : C7 Region : 4 Name: Whitley County

Waste Characterization:

Substance : Bulked paint wastes, solvents, heavy metals
Amount : 320,000 lbs Amount in lbs : 320,000
Concentration : Unknown
Waste category : Solvents,metals
Waste matrix : Solid

Waste Disposition

Type of treatment/disposal : Landfill
Destination : SCA Services
Facility location : Pinewood State : SC
Distance in miles : 300

Costs of Waste Disposal Estimated

Laboratory/Analysis cost :
Hazardous substance transportation cost : 36,000.00
Non-hazardous substance transportation cost :
Hazardous substance disposal cost :
Non-hazardous substance disposal cost :
Comments : Estimate is for both transport and disposal.

10/10/86

LDR Historical Database
Data Collection Form

Site Data:

EPA Region : 5
Site ID# : M3
Site name : Abandoned Drums
Site location : Ecorse
State : MI
Start date : 04/13/84
Finish date : 06/27/84
Length : 76 Days
Total cost : $6,095
NPL Rank : No
Date on NPL : / /
Type of action: Removal
On or off site: Off
OSC Report : No
OSC : Ross Powers
Comments : 2 polreps, no action memo.

Waste Information:

Site ID# : M3 Region : 5 Name: Abandoned Drums

Waste Characterization:

Substance : Pesticides, solvents, tar, flammable solids
Amount : 4 drums Amount in lbs : 1,835
Concentration : Unknown
Waste category : Solvents
Waste matrix : Solids

Waste Disposition

Type of treatment/disposal : Landfill
Destination : Fondessy Enterprises
Facility location : Oregon State : OH
Distance in miles : 50

Costs of Waste Disposal

Laboratory/Analysis cost :
Hazardous substance transportation cost : 175.00
Non-hazardous substance transportation cost :
Hazardous substance disposal cost : 200.00
Non-hazardous substance disposal cost :
Comments :

10/10/86

LDR Historical Database
Data Collection Form

Page: 1

Site Data:

EPA Region : 4
Site ID# : A7
Site name : City Chemical
Site location : Orlando
State : FL
Start date : 03/05/84
Finish date : 05/29/84
Length : 86 Days
Total cost : $432,731
NPL Rank : No
Date on NPL : / /
Type of action: Removal
On or off site: Both
OSC Report : No
OSC : Jan Rogers
Comments : Information obtained from polreps.

Waste Information:

Page: 2

Site ID# : A7 Region : 4 Name: City Chemical

Waste Characterization:
Substance : Solidified sludges w/TCE, etc.
Amount : 250,000 lbs Amount in lbs : 250,000
Concentration : TOC>500ppm
Waste category : Calif-HO
Waste matrix : Sludge/solid

Waste Disposition
Type of treatment/disposal : Landfill
Destination : SCA Services
Facility location : Pinewood State : SC
Distance in miles : 325

Costs of Waste Disposal
Laboratory/Analysis cost :
Hazardous substance transportation cost :
Non-hazardous substance transportation cost :
Hazardous substance disposal cost :
Non-hazardous substance disposal cost :
Comments :

10/10/86

LDR Historical Database
Data Collection Form

Site Data:

EPA Region : 5
Site ID# : K9
Site name : Rumple Junk Yard
Site location : Isanti
State : MN
Start date : 02/29/84
Finish date : 05/01/84
Length : 63 Days
Total cost : $170,500
NPL Rank : No
Date on NPL : / /
Type of action: Removal
On or off site: Off/On
OSC Report : Yes
OSC : George Madany
Comments :

Waste Information:

Page: 4

Site ID# : K9 Region : 5 Name: Rumple Junk Yard

Waste Characterization:
Substance : Flammable solids (solvents?)
Amount : 132 drums Amount in lbs : 60,548
Concentration : Unknown
Waste category : Solvents?
Waste matrix : Solid/sludge

Waste Disposition
Type of treatment/disposal : Landfill
Destination : Fondessy Enterprises
Facility location : Oregon State : OH
Distance in miles : 700

Costs of Waste Disposal
Laboratory/Analysis cost :
Hazardous substance transportation cost :
Non-hazardous substance transportation cost :
Hazardous substance disposal cost : 7,054.24
Non-hazardous substance disposal cost :
Comments : Lab and Transportation costs included in figures on page 2.

10/10/86

LDR Historical Database
Data Collection Form

Site Data:

EPA Region : 6
Site ID# : 66
Site name : Stewco, Inc.
Site location : Waskom
State : TX
Start date : 03/31/84
Finish date : 05/01/84
Length : 32 Days
Total cost : $529,372
NPL Rank : GR 4
Date on NPL : 10/15/84
Type of action: On-site treatment, removal
On or off site: On/off
OSC Report : No
OSC : E. Wallace Coooper
Comments :

Waste Information:

Site ID# : 66 Region : 6 Name: Stewco, Inc.

Waste Characterization:

Substance : PNAs-fluorene,phenanthrene,ethylbenzene,toluene
Amount : 5,500 cu yd Amount in lbs : 12,100,000
Concentration : 40-270 ppm
Waste category : Other hazardous, solvents
Waste matrix : Sludge

Waste Disposition

Type of treatment/disposal : Landfill
Destination : Chemical Waste Management
Facility location : Port Arthur State : TX
Distance in miles : 210

Costs of Waste Disposal From Region 6

Laboratory/Analysis cost :
Hazardous substance transportation cost : 131,000.00
Non-hazardous substance transportation cost :
Hazardous substance disposal cost : 394,500.00
Non-hazardous substance disposal cost :
Comments : Confirmed and corrected by Region 6 file check.

ATTACHMENT 2

```
SITENAME : BURNT FLY BOG                                                                  PAGE

                                          OFFSITE LANDFILL REPORT

 ROD                                                                                   CONTAMINANT CONCENTRATIONS
SIGNED          CLEANUP VOLUME                CONTAMINANT                         FROM               TO              AVERAGE       UNITS

SOURCE : SOLIDS  DEBRIS/TRASH DUMP

11/16/83            2,345.0 CY  PHENOL                                                              835.00000                    UG/KG
              ( 473,900gal )METHYLENE CHLORIDE                                   300.00000   1,750.00000                    UG/KG

SOURCE : SLUDGES  SPILLS/DUMPING OF LIQUIDS

                      250.0 CY  METHYLENE CHLORIDE                                                 0.30000                    PPM
               (50,500gal)  TETRACHLOROETHENE                                                      0.30000                    PPM
                            TRICHLOROETHENE                                                        0.50000                    PPM

SOURCE : SLUDGES  SURFACE IMPOUNDMENT

                   17,540.0 CY  2,4 DIMETHYLPHENOL                                              1,100.00000                    PPB
              ( 3.5x10^6 gal)   PHENOL                                                          1,700.00000                    PPB
                            TRICHLOROETHENE                                                    11,300.00000                    PPB
                            PCB 1242                                                           32,000.00000                    PPB
                            NAPHTHALENE                                                        46,730.00000                    PPB
                            ARSENIC                                                                0.01000                    PPM
                            BENZENE                                                             3,830.00000                    PPB
                            CADMIUM                                                                0.01300                    PPM
                            ETHYL BENZENE                                                      13,400.00000                    PPB
                            CHROMIUM                                                               0.10000                    PPM
                            XYLENES                                                           440,000.00000                    PPB
                            COPPER                                                                 0.13300                    PPM
                            TOLUENE                                                            70,000.00000                    PPB
                            LEAD                                                               32,000.00000                    PPM
                            1,2 DICHLOROBENZENE                                                 7,000.00000                    PPB
                            NICKEL                                                                 0.06300                    PPM
                            1,1 DICHLOROETHANE                                                    390.00000                    PPB
                            TETRACHLOROETHENE                                                   5,000.00000                    PPB
                            1,2 TRANS DICHLOROETHENE                                            1,730.00000                    PPB
                            PHENANTHRENE                                                        3,300.00000                    PPB
                            METHYLENE CHLORIDE                                                 30,000.00000                    PPB
                            ZINC                                                               12,000.00000                    PPM
```

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```
SITENAME: SWOPE OIL
                                   OFFSITE CONDUCT REPORT

                                                                   CONTAMINANT CONCENTRATIONS
 ROD                                                              FROM          TO            AVERAGE     UNITS
SIGNED          CLEANUP VOLUME              CONTAMINANT

SOURCE: SLUDGES  BURIED WASTE
                                                                                4,600.00000               PPB
09/27/85            1,375.0 CY   DI-N-OCTYL PHTHALATE              5,100.00000  8,500.00000               PPB
                                 2-METHYLNAPHTHALENE               1,900.00000  4,300.00000               PPB
                                 NAPHTHALENE                                       86.00000               PPB
                                 XYLENES                               7.10000    106.50000               PPB
                                 PCB-1254                         10,400.00000 21,100.00000               PPB
                                 BIS(2-ETHYLHEXYL)PHTHALATE
```

(277,700 gal)

```
SITENAME : CEMETERY DUMP                                              PAGE 15

                                    OFFSITE LANDFILL REPORT

 ROD                                                                  CONTAMINANT CONCENTRATIONS
SIGNED          CLEANUP VOLUME          CONTAMINANT                 FROM            TO           AVERAGE      UNITS
-------         ------------            -----------

SOURCE : SOLIDS  BURIED DRUMS

09/11/85             1,705.0 CY  BENZENE                          10.000000  1,000.000000                  MG/KG
                                 CHLOROBENZENE                    10.000000  1,000.000000                  MG/KG
                                 XYLENES                          10.000000  1,000.000000                  MG/KG
                                 TOLUENE                          10.000000  1,000.000000                  MG/KG
                                 TOTAL CHLORINATED HYDROCARBONS  [illegible]00.000000  1,1[illegible]0.000000  MG/KG
                                 CADMIUM                           1.1[illegible]0000    11.000000         MG/KG
                                 CHROMIUM                         1[illegible].000000   [illegible]00.000000  MG/KG
                                 PCB 1254                                     10.000000                    MG/KG
                                 ARSENIC                           [illegible]            7.000000         MG/KG
                                 BARIUM                            8.000000   [illegible]0.000000          MG/KG
                                 PCB 1242                                    [illegible]00.000000          MG/KG
                                 PCB 1260                                     [illegible].000000           MG/KG
                                 COPPER                           [illegible].100000   [illegible].000000  MG/KG
                                 LEAD                             [illegible]00.000000  [illegible]70.000000 MG/KG
                                 MERCURY                           0.0[illegible]000     0.400000          MG/KG
                                 NICKEL                           11.000000    11[illegible].000000        MG/KG
                                 SELENIUM                          0.[illegible]00000    0.[illegible]00000 MG/KG
                                 SILVER                                       [illegible].000000           MG/KG
                                 ZINC                             [illegible].000000  [illegible],[illegible]00.000000  MG/KG
```

1 344,000gal

```
SITENAME: BAYOU BONFOUCA

                              OFFSITE LANDFILL REPORT

                                                                  CONTAMINANT CONCENTRATIONS
 ROD
SIGNED        CLEANUP VOLUME          CONTAMINANT                 FROM              TO            AVERAGE     UNITS
---------     -----   ------  -

SOURCE: SOLIDS--SPILLS/DUMPING OF LIQUIDS

08/15/85         5,000.0 CY   ACENAPHTHENE                1,[illegible]00.00000  8,000.00000                 UG/G
              (1.01x10^6 cyd) ANTHRACENE                  [illegible]00.000001[illegible]0,000.00000          UG/G
                              BENZO(A)ANTHRACENE          1,700.00000  [illegible],700.00000                 UG/G
                              2-METHYLNAPHTHALENE           400.00000  [illegible],400.00000                 UG/G
                              BENZO(A)PYRENE                           1,100.00000                 UG/G
                              NAPHTHALENE                   400.00000 11,000.00000                 UG/G
                              CHRYSENE                    [illegible],000.00000  [illegible],000.00000                 UG/G
                              FLUORANTHENE               15,000.00000 [illegible]0,000.00000                 UG/G
                              FLUORENE                    [illegible],400.00000 11,000.00000                 UG/G
                              BENZO(B)FLUORANTHENE                     1,000.00000                 UG/G
                              DIBENZOFURAN                1,700.00000 10,000.00000                 UG/G
                              PHENANTHRENE               1[illegible],000.00000 [illegible],000.00000                 UG/G
                              PYRENE                      7,000.00000 1[illegible],000.00000                 UG/G
                              BENZENE                                  [illegible],000.00000                 UG/KG
                              ETHYL BENZENE                           1[illegible],000.00000                 UG/KG
                              XYLENES                                 [illegible]7,000.00000                 UG/KG
                              STYRENE                                  7,000.00000                 UG/KG
                              TOLUENE                                 1[illegible],000.00000                 UG/KG
                              2-BUTANONE                 [illegible]0,000.00000 [illegible]1,000.00000                 UG/KG
```

SITENAME : WESTERN PROCESSING

OFFSITE LANDFILL REPORT

SOURCE : SOLIDS BURIED WASTE

ROD SIGNED	CLEANUP VOLUME	CONTAMINANT	CONTAMINANT CONCENTRATIONS FROM	TO	AVERAGE	UNITS
09/25/85	10,650.0 CY	1,1,1 TRICHLOROETHANE			[illegible]	UG/KG
	(2.15×10^4 gal)	PHENOL			[illegible]	UG/KG
		1,2 TRANS DICHLOROETHENE			[illegible]	UG/KG
		BIS(2 ETHYLHEXYL)PHTHALATE			[illegible]	UG/KG
		TRICHLOROETHENE			[illegible]	UG/KG
		NAPHTHALENE			[illegible]	UG/KG
		PCB NOS			[illegible]	UG/KG
		PYRENE			[illegible]	UG/KG
		ARSENIC			[illegible]	UG/KG
		METHYLENE CHLORIDE			[illegible]	UG/KG
		CADMIUM			[illegible]	UG/KG
		TOLUENE			[illegible]	UG/KG
		CHROMIUM			[illegible]	UG/KG
		FLUORANTHENE			[illegible]	UG/KG
		ETHYL BENZENE			[illegible]	UG/KG
		TETRACHLOROETHENE			[illegible]	UG/KG
		BENZO(A)ANTHRACENE			[illegible]	UG/KG
		PHENANTHRENE			[illegible]	UG/KG
		COPPER			[illegible]	UG/KG
		LEAD			[illegible]	UG/KG
		NICKEL			[illegible]	UG/KG
		ZINC			[illegible]	UG/KG

APPENDIX D

Waste Volumes Analysis for RCRA Corrective Action

Submitted to:

Office of Solid Waste
U.S. Environmental Protection Agency
401 M Street, S.W.
Washington, D.C. 20460

Submitted by:

Office of Waste Program Enforcement
RCRA Enforcement Division
U.S. Environmental Protection Agency
401 M Street, S.W.
Washington, D.C. 20460

September 22, 1986

RCRA Corrective Action
Exemption RCRA Solvent Waste

Number of RCRA Corrective Action (C.A.) sites projected for FY'87: 157 sites. Assuming 25% of sites contain solvent waste:

$$\begin{array}{lr} & 157 \\ & \underline{x.25} \\ (1) & 39.25 \end{array}$$

39 (no. of C.A. sites containing F001-F005 solvent waste)

Assuming 50% of (1) sites would use land disposal:

$$\begin{array}{lr} & 39.25 \\ & \underline{x.50} \\ (2) & 19.63 \end{array}$$

20 (no. of C.A. sites containing F001-F005 solvent waste which would be affected by Land Disposal Restrictions)

Assuming that the average volume of RCRA C.A. waste per site is 40% of average volume from CERCLA Remedial Actions:

$\bar{V}$ Incinerated = 3,494 yd^3

$\bar{V}$ Land = $\underline{4,132}$ yd^3

$\bar{V}$ CERCLA (Total) = 7,626 yd^3

$\bar{V}$ RCRA = 0.40 x $\bar{V}$ CERCLA
= 0.40 x 7,626 yd^3

(3) = 3,050 cy (804,662 gal)

Average volume of RCRA C.A. solvent waste projected for off-site incineration (per site):

Incineration FY '87: 1,397 cy (368,623 gal)
Total: 27,940 cy (7,370,264 gal)

Average Volume of RCRA C.A. solvent waste projected for land disposal (per site) that would require incineration as an alternative technology if subject to the ban:

Disposal FY '87: 1,653 cy (435,933 gal)
Total: 33,060 cy (8,720,863 gal)

Estimated total volume of RCRA C.A. solvent waste FY '87:

(4) Total: 61,000 cy (16,091,127 gal)

(Data indicates percentage may be higher)

1986. Thus this Superfund waste volumes analysis gives estimates of pertinent waste that will be generated in the next year, or approximately between November, 1987, and November, 1988. This estimate represents wastes generated annually by the Superfund program.

The Hazardous and Solid Waste Amendments (HSWA) of 1984 waive the effective date of the land disposal restrictions for CERCLA solvent and dioxin waste that is soils and debris (HSWA §3004(d) and (e)). This waste becomes subject to the restrictions in November, 1988. Therefore, the quantity of Superfund soils and debris generated annually is not germane to the analysis given here, and has not been evaluated.

The January, 1986 proposed rulemaking defined best demonstrated available technology (BDAT) for dioxin-contaminated waste as thermal destruction. The proposal also gave a two-year variance from the land disposal restrictions for this waste based on the fact that no incinerators had been authorized to accept dioxin waste, and thus no alternative capacity was available. At the time of this analysis, there are still no such authorized facilities. Because the volume of Superfund-generated dioxin waste does not bear on the decision that capacity for these wastes is inadequate,' this analysis does not include an estimate of dioxin wastes generated annually by the CERCLA program.

Superfund Demand for Alternative Capacity

Future CERCLA demand on alternative capacity may originate in two ways:

- Waste that is destined for off-site RCRA treatment or recycling facilities will compete with industry-generated waste (RCRA waste) for treatment/recycling capacity. This CERCLA waste may or may not contain solvents. (EPA assumes that planned on-site actions involving alternatives to land disposal would not compete for RCRA capacity.)

- The land disposal restrictions for solvents will require that Superfund waste subject to these restrictions be treated prior to off-site land disposal. Therefore, Superfund waste that contains solvents (and that is not otherwise waived from the restrictions) will compete with RCRA waste for alternative capacity.

Sources of Data

EPA's Office of Emergency and Remedial Response (OERR) is in the process of developing a database containing information on remedial action sites. The data include waste characterization (e.g., matrix, constituents and concentrations, source, volume), and alternatives considered and chosen for site clean up. The data are obtained from a review of RIs, FSs, RODs, enforcement

Based on the assumption that FY84 was a representative year for removal actions, it is assumed that in the next year, the demand generated by removal actions for such alternative treatment will remain constant with one exception: removal wastes (excluding soils and debris) that contain solvents and that were land disposed in FY84, will require alternative capacity if the land disposal restrictions are effective for this waste in November 1986.

According to the database, in FY84 12 removal action sites resulted in off-site land disposal of sludge and solid waste containing at least one of the solvents covered by this rulemaking. Information on these 12 sites is given in Attachment 1. The total volume of this removal waste was 17,200,000 pounds or 2,060,000 gallons. Although a few sites landfilled solvent-contaminated liquids in FY84, most liquids are no longer landfilled, and are already being sent to alternative treatment/recycling facilities. Therefore, these liquids would not exert an increase in demand for alternative capacity in the next year, and are not included in this analysis.

According to the data given in Attachment 1, at least nine of the 12 solvent wastes are "solvents," or "flammable liquids/solvents" or "solvents mixed with other types of hazardous substances." Without further analysis of waste sources, EPA cannot determine if these wastes were actually spent solvents that would fall under F001, F002, F003, F004, or F005 waste codes. Therefore, for the purpose of this analysis, EPA is assuming conservatively that all of the solvent wastes are spent solvents and would be subject to the land disposal restrictions.

Furthermore, little concentration data are available for these 12 wastes. Two wastes included concentration information on specific restricted solvents. Two wastes reportedly contained high concentrations of some contaminants, although not necessarily restricted solvents (see Attachment 1). The concentration of contaminants in the other eight streams was not described in the data sources. Typically, removal action waste is significantly concentrated, since removal actions take place to alleviate substantial, and often immediate, hazards. In this analysis, EPA assumes that all of the waste identified by the removal database would contain at least one solvent that exceeds the promulgated restriction levels.

In summary, the total volume of solvent waste generated by Superfund removal actions projected to require alternative capacity in the next year is estimated to be 2,060,000 gallons. These wastes are sludges and solids, and are assumed to be spent solvents containing concentrations of solvents that exceed promulgated land disposal restriction levels.

TABLE 1

CERCLA WASTE VOLUMES: WASTES PRESENT AT REMEDIAL ACTION SITES AND FOR WHICH OFF-SITE INCINERATION IS PROJECTED BETWEEN NOVEMBER 1986 AND NOVEMBER 1987

EPA Region	Site Name, State	Date ROD signed	Waste Description	Estimated Volume[1]
02	Bridgeport, NJ	12/31/84	Liquids containing PCBs, chlorinated hydrocarbons	766,000 gal
	Swope Oil, NJ	09/27/85	Liquids containing organics	17,000 gal
			Solids containing organics and metals	4,200 gal
			Soils containing >500 ppm PCBs	38,300 gal
	Bog Creek, NJ	09/30/85	Soil containing volatile organics	1,320,000 gal[2]
			Sediments containing volatile organics	650,000 gal[2]
			Sludges containing solvents and metals	485,000 gal
03	Lackawanna Refuse, PA	03/22/85	Liquids, solvents Pb, Cr	200,000 gal
	Laskin/Poplar, OH	RI/FS[3]	Sludge containing organics	800,000 gal
	Acme Solvents, IL	09/27/85	Sludges, solids containing solvents, PCBs	1,250,000 gal[2]
08	Woodbury Chemical, CO	07/19/85	Rubble and soil containing pesticides	50,500 gal
			TOTAL	5,581,000 gal

---

[1] Conversion factors: 8.34 lb/gal; 2,200 lb/cubic yard; 2,200 lb/metric ton
[2] One-half of total waste volume; second half projected to be incinerated in FY88
[3] Remedial Investigation (RI)/Feasability Study (FS) drafted.
ROD = Record of Decision
Sources: RI/FS reports, RODs, conversations with EPA Regional staff

Planned Land Disposal. Off-site land disposal of solvent-containing sludge and solid waste from several remedial action sites is planned for the next year. As with removal wastes containing solvents, EPA cannot determine which of these wastes are actually spent solvent waste subject to this rulemaking. Based on the waste sampling data contained in the remedial action database (see Attachment 2), most of these wastes contain at least one solvent in concentrations that exceed the promulgated restriction levels. Solely for the purpose of this analysis, all of this waste is assumed to require alternative capacity if the land disposal restrictions go into effect for this waste in November 1986.

Table 3 lists the remedial action sites and the volume of solvent-containing sludge and solid waste to be land disposed in the next year from each site. The total volume of such waste is 4,140,000 gallons.

Conclusions

In the future, CERCLA waste will complete with RCRA waste for available hazardous waste treatment capacity. In the next year, 5,420,000 gallons of organic-contaminated Superfund waste will be sent to off-site commercial incinerators. In addition, EPA is currently planning in the next year to land dispose off-site 2,060,000 gallons of solvent-containing sludges and solids from removal actions, and 4,140,000 gallons of solvent-contaminated sludges and solids from remedial actions. Should the land disposal restrictions for solvents be effective for these wastes in November, 1986, EPA would be prohibited from disposing of these wastes in off-site landfills, and would require alternative capacity.

The likely treatment alternative for sludges and solids containing solvents is incineration, which EPA has determined to be BDAT. Therefore, the 2,060,000 gallons plus 4,140,000 gallons or 6,200,000 gallons of CERCLA solvent waste would probably compete for incineration capacity if restricted from land disposal.

TABLE 4

SUMMARY OF SOLVENT WASTE THAT WILL BE GENERATED BY THE CERCLA PROGRAM BETWEEN NOVEMBER 1987 AND NOVEMBER 1988

Source	Volume
Net increase in planned off-site incineration of remedial waste	5,420,000 gallons
Planned land disposal of remedial waste	4,140,000 gallons
Projected land disposal of removal waste (based on FY84 removals)	2,060,000 gallons

10/10/86

LDR Historical Database
Data Collection Form

Page: 1

Site Data:

EPA Region : 3
Site ID# : B2
Site name : Kane and Lombard Streets
Site location : Baltimore
State : MD
Start date : 05/08/84
Finish date : 06/08/84
Length : 32 Days
Total cost : $521,571
NPL Rank : GR 11
Date on NPL : 10/15/84
Type of action: Removal/stabilization
On or off site: Off
OSC Report : Yes
OSC : Robert Caron
Comments :

Waste Information:

Page: 2

Site ID# : B2 Region : 3 Name: Kane and Lombard Streets

Waste Characterization:

Substance : Solvents, organics, heavy metals
Amount : 54 drums Amount in lbs : 24,770
Concentration : High, see comments
Waste category : Solvents,Calif-metal
Waste matrix : Solid

Waste Disposition

Type of treatment/disposal : Landfill
Destination : Fondessy Enterprises
Facility location : Oregon State : OH
Distance in miles : 470

Costs of Waste Disposal

Laboratory/Analysis cost :
Hazardous substance transportation cost :
Non-hazardous substance transportation cost :
Hazardous substance disposal cost :
Non-hazardous substance disposal cost :
Comments : EthylB 2800ppm, Toluene 25.5%, Cr 1100ppm, Pb 6000 ppm, PNA 25

10/10/86 LDR Historical Database Page: 1
Data Collection Form

Site Data:

EPA Region : 3
Site ID# : 75
Site name : Wheeling Hill
Site location : Wheeling
State : WV
Start date : 09/15/83
Finish date : 12/28/83
Length : 105 Days
Total cost : $4,372
NPL Rank : No
Date on NPL : / /
Type of action: Removal
On or off site: Off
OSC Report : Yes
OSC : Benton Wilmoth
Comments :

Waste Information: Page: 2

Site ID# : 75 Region : 3 Name: Wheeling Hill

Waste Characterization:
Substance : Paint solvents
Amount : 10 drums Amount in lbs : 4,587
Concentration : Unknown
Waste category : Solvents
Waste matrix : Solid

Waste Disposition
Type of treatment/disposal : Landfill
Destination : Chemical Waste Management
Facility location : Emelle State : AL
Distance in miles : 870

Costs of Waste Disposal No cost data.
Laboratory/Analysis cost : 201.00
Hazardous substance transportation cost : 330.00
Non-hazardous substance transportation cost :
Hazardous substance disposal cost : 273.00
Non-hazardous substance disposal cost :
Comments :

10/10/86

LDR Historical Database
Data Collection Form

Page: 1

Site Data:

EPA Region : 4
Site ID# : C4
Site name : Potters Pits
Site location : Maco
State : NC
Start date : 03/15/84
Finish date : 04/05/84
Length : 22 Days
Total cost : $240,671
NPL Rank : No
Date on NPL : / /
Type of action: Removal
On or off site: Off
OSC Report : No
OSC : Sue Fields
Comments : Information obtained from Action Memo and polreps.

Waste Information:

Page: 2

Site ID# : C4 Region : 4 Name: Potters Pits

Waste Characterization:

Substance : Hazardous waste solids: solvents and creosote
Amount : 3,520,000 lbs Amount in lbs : 3,520,000
Concentration : Unknown
Waste category : Solvents
Waste matrix : Solid

Waste Disposition

Type of treatment/disposal : Landfill
Destination : SCA Services
Facility location : Pinewood State : SC
Distance in miles : 150

Costs of Waste Disposal

Laboratory/Analysis cost :
Hazardous substance transportation cost :
Non-hazardous substance transportation cost :
Hazardous substance disposal cost :
Non-hazardous substance disposal cost :
Comments :

10/10/86

LDR Historical Database
Data Collection Form

Site Data:

EPA Region : 4
Site ID# : 95
Site name : Roosevelt Highway Spill
Site location : College Park
State : GA
Start date : 12/08/83
Finish date : 12/15/83
Length : 8 Days
Total cost : $34,937
NPL Rank : No
Date on NPL : / /
Type of action: Removal
On or off site: Off
OSC Report : Yes
OSC : Ed Hatcher
Comments :

Waste Information:

Site ID# : 95 Region : 4 Name: Roosevelt Highway Spill

Waste Characterization:
Substance : Hazardous waste solids-solvents:xylene,butanol,MEK
Amount : 144 cu yd Amount in lbs : 316,800
Concentration : Unknown
Waste category : Solvents
Waste matrix : Solid

Waste Disposition
Type of treatment/disposal : Landfill
Destination : Chemical Waste Management
Facility location : Emelle State : AL
Distance in miles : 250

Costs of Waste Disposal
Laboratory/Analysis cost :
Hazardous substance transportation cost :
Non-hazardous substance transportation cost :
Hazardous substance disposal cost :
Non-hazardous substance disposal cost :
Comments : Files say 246 drums labeled dioxin or flammable. Wastes are sc

10/10/86

LDR Historical Database
Data Collection Form

Site Data:

EPA Region : 5
Site ID# : M3
Site name : Abandoned Drums
Site location : Ecorse
State : MI
Start date : 04/13/84
Finish date : 06/27/84
Length : 76 Days
Total cost : $6,095
NPL Rank : No
Date on NPL : / /
Type of action: Removal
On or off site: Off
OSC Report : No
OSC : Ross Powers
Comments : 2 polreps, no action memo.

Waste Information:

Page: 2

Site ID# : M3 Region : 5 Name: Abandoned Drums

Waste Characterization:

Substance : Pesticides, solvents, tar, flammable solids
Amount : 4 drums Amount in lbs : 1,835
Concentration : Unknown
Waste category : Solvents
Waste matrix : Solids

Waste Disposition

Type of treatment/disposal : Landfill
Destination : Fondessy Enterprises
Facility location : Oregon State : OH
Distance in miles : 50

Costs of Waste Disposal

Laboratory/Analysis cost :
Hazardous substance transportation cost : 175.00
Non-hazardous substance transportation cost :
Hazardous substance disposal cost : 200.00
Non-hazardous substance disposal cost :
Comments :

10/10/86

LDR Historical Database
Data Collection Form

Site Data:

EPA Region : 5
Site ID# : K9
Site name : Rumple Junk Yard
Site location : Isanti
State : MN
Start date : 02/29/84
Finish date : 05/01/84
Length : 63 Days
Total cost : $170,500
NPL Rank : No
Date on NPL : / /
Type of action: Removal
On or off site: Off/On
OSC Report : Yes
OSC : George Madany
Comments :

Waste Information:

Site ID# : K9 Region : 5 Name: Rumple Junk Yard

Waste Characterization:

Substance : Flammable solids (solvents?)
Amount : 132 drums Amount in lbs : 60,548
Concentration : Unknown
Waste category : Solvents?
Waste matrix : Solid/sludge

Waste Disposition

Type of treatment/disposal : Landfill
Destination : Fondessy Enterprises
Facility location : Oregon State : OH
Distance in miles : 700

Costs of Waste Disposal

Laboratory/Analysis cost :
Hazardous substance transportation cost :
Non-hazardous substance transportation cost :
Hazardous substance disposal cost : 7,054.24
Non-hazardous substance disposal cost :
Comments : Lab and Transportation costs included in figures on page 2.

ATTACHMENT 2

```
SITENAME : SWOPE OIL                                                        PAGE   7
                                            OFFSITE CONDUIT REPORT

 ROD                                                                          CONTAMINANT CONCENTRATIONS
SIGNED          CLEANUP VOLUME              CONTAMINANT                  FROM                   TO            AVERAGE       UNITS
------- - -     --- --- - -     ------- -

SOURCE: SLUDGES- BURIED WASTE

09/27/85               1,375.0 CY   DI N OCTYL PHTHALATE
                                    2 METHYLNAPHTHALENE                                  4,600.000000                           PPB
                                    NAPHTHALENE                          5,100.000000   8,300.000000                           PPB
                                    XYLENES                              1,300.000000   4,300.000000                           PPB
                                    PCB 1254                                                 66.000000                           PPB
                                    BIS(2 ETHYLHEXYL)PHTHALATE               9.1 [illegible]   120.[illegible]                        PPB
                                                                        10,4[illegible].000000  21,100.000000                    PPB
                                                                                                                                 PPB
```

(277,700 gal)

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```
SITENAME: BAYOU BONFOUCA

                                   OFFSITE CONTACT REPORT

 ROD                                                                    CONTAMINANT CONCENTRATIONS
SIGNED        CLEANUP VOLUME        CONTAMINANT                       FROM          TO          AVERAGE     UNITS
-------       --------------

SOURCE: SOLIDS--SPILLS/DUMPING OF LIQUIDS

08/15/85          5,000.0 CY  ACENAPHTHENE                   [illegible]   [illegible]                MG/KG
            (1.01x10^6 cyd)   ANTHRACENE                     [illegible]   [illegible]                MG/KG
                              BENZO(A)ANTHRACENE             [illegible]   [illegible]                MG/KG
                              2-METHYLNAPHTHALENE            [illegible]   [illegible]                MG/KG
                              BENZO(A)PYRENE                               [illegible]                MG/KG
                              NAPHTHALENE                    [illegible]   [illegible]                MG/KG
                              CHRYSENE                       [illegible]   [illegible]                MG/KG
                              FLUORANTHENE                   [illegible]   [illegible]                MG/KG
                              FLUORENE                       [illegible]   [illegible]                MG/KG
                              BENZO(B)FLUORANTHENE                         [illegible]                MG/KG
                              DIBENZOFURAN                   [illegible]   [illegible]                MG/KG
                              PHENANTHRENE                   [illegible]   [illegible]                MG/KG
                              PYRENE                         [illegible]   [illegible]                MG/KG
                              BENZENE                                      [illegible]                UG/KG
                              ETHYL BENZENE                                [illegible]                UG/KG
                              XYLENES                                      [illegible]                UG/KG
                              STYRENE                                      [illegible]                UG/KG
                              TOLUENE                                      [illegible]                UG/KG
                              [illegible]                    [illegible]   [illegible]                UG/KG
```

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